

EPA'S PROPOSED GHG STANDARDS FOR NEW
POWER PLANTS AND H.R. _____,
WHITFIELD-MANCHIN LEGISLATION

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND POWER
OF THE
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COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED THIRTEENTH CONGRESS
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EPA'S PROPOSED GHG STANDARDS FOR NEW POWER PLANTS AND H.R. —, WHITFIELD- MANCHIN LEGISLATION

THURSDAY, NOVEMBER 14, 2013

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:39 a.m., in room 2123 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Scalise, Hall, Shimkus, Terry, Burgess, Latta, Cassidy, Olson, McKinley, Gardner, Kinzinger, Griffith, Barton, Upton (ex officio), McNerney, Tonko, Yarmuth, Green, Capps, Barrow, Dingell, and Waxman (ex officio).

Staff present: Nick Abraham, Legislative Clerk; Gary Andres, Staff Director; Charlotte Baker, Press Secretary; Sean Bonyun, Communications Director; Allison Busbee, Policy Coordinator, Energy and Power; Patrick Currier, Counsel, Energy and Power; Tom Hassenboehler, Chief Counsel, Energy and Power; Brandon Moonney, Professional Staff Member; Mary Neumayr, Senior Energy Counsel; Chris Sarley, Policy Coordinator, Environment and the Economy; Peter Spencer, Professional Staff, Oversight; Jean Woodrow, Director, Information Technology; Jeff Baran, Democratic Senior Counsel; Greg Dotson, Democratic Staff Director, Energy and Environment; Caitlin Haberman, Democratic Policy Analyst; and Alexandra Teitz, Senior Counsel, Energy and Environment.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. I would like to call this hearing to order. As you know, this morning we are having a hearing on the EPA's proposed greenhouse gas standards for new coal powered plants, and also we are going to touch on discussion draft legislation that has been introduced by myself, Senator Manchin, Morgan Griffith, David McKinley, John Shimkus, and many others in the Congress. Because of what many of us view as the extreme position in this greenhouse gas regulation that EPA has taken, our legislation would allow EPA to regulate greenhouse gases, but Congress would set the parameters for that regulation. And our legislation would

apply to new plants, as well as existing plants, although they would be treated in significantly different ways.

Just 1 year ago James Wood, the Deputy Assistant Secretary of the Department of Energy's Office of Clean Coal, made this statement regarding CCS technologies. "Unlike the cost effective advanced technologies that were developed to reduce emissions of nitrogen, sulfur, mercury and particulates, technologies to capture and store carbon emissions from electric power plants are elusive, expensive and, although there are CO₂ separation technologies in use in the natural gas and chemical processing industries, there has not yet been deployment in the electric power industry, and there is little history of the integration of these technologies with electric generation in reliable or cost-effective modes." So bottom line is we all know that EPA cannot point to a single completed operational facility that meets the emissions standard it has set for coal in this proposed regulation, and all of the demonstration projects that they refer to have received huge government subsidies. All of them are cost overruns. None of them are in operation.

Now, Section 111 of the Clean Air Act defines the term "standard of performance" as "a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which the Administrator determines has been adequately demonstrated." And that is the key word. And I am sure that Ms. McCabe, who will be testifying later this morning, would agree, and knows full well, that there is going to be legal challenges on this proposed rule in the court system, because they have gone a long way down the road that they have never traveled before in setting these demonstration projects as something that is adequately demonstrated that the technology can work.

So EPA is doing everything it can do, with the backing of the President, to move us down a road that we may not be yet ready to move down. As a matter of fact, when Congress addressed this issue the last time, the Democrats controlled the House and the Senate, and the Markey-Waxman bill was rejected by the U.S. Senate. They could not get it through. And so now they are attempting to do, by regulation, what cannot be done through legislation. So this morning we find ourselves living in a country where we are the only country in the world where you cannot legally build a new coal powered plant because the technology is not available to meet the emission standard.

Now, I recognize that people are not rushing out to build new coal powered plants because natural gas prices are so low. But why in the world would a country, struggling with economic growth, trying to be competitive in the global marketplace, say to its citizens, and make a policy decision without a national debate, that one of our most abundant resources will not be used in America? Now, people say, well, natural gas prices are so low, and they are, as I have stated, but what is happening in Europe? How many of you know that over the last 20 months they are in the process of closing down 30 gigawatts of new natural gas plants? Why? Because natural gas coming out of Russia is so expensive, so what happened last year in Europe?

Well, we view Europe as a green arena, and I am for all of the above, so they moved quickly down that road. 22 percent of their electricity is produced from renewables, but gas prices are so high that last year they imported 45 percent of our coal export market, which was the largest export market we had had in about 15 years, and so they are now building coal plants in Europe because of the high cost of natural gas. So why, in America, would we make the decision because gas prices are low now, we are not going to allow a new coal powered plant to be built? So that is what we are going to try to explore this morning. I understand there are different views on it, and, obviously, that is why we have hearings. But I look forward to the testimony of all our witnesses today on an issue that is very important.

[The prepared statement of Mr. Whitfield follows:]

PREPARED STATEMENT OF HON. ED WHITFIELD

This morning, we continue our oversight of EPA's numerous regulations targeting the use of coal. The regulation at issue today, the proposed greenhouse gas standards for new power plants, may well be the most damaging one yet in the agency's all-out attack on one of our nations' most affordable, reliable energy sources, coal.

There is a great deal about this proposed rule that is concerning for states and ratepayers. The proposed rule has serious implications for the affordability, reliability, and diversity of the nation's electricity portfolio. Today, we will examine this proposed rule and also discuss a more reasonable alternative. Senator Joe Manchin and I have released draft legislation that allows for greenhouse gas emissions reductions, but it does so in a manner that ensures coal remains a key part of America's energy mix. It would simply provide that in setting greenhouse gas standards for new plants, that EPA base the standards on tested and proven technologies that are commercially achievable. It would also provide that Congress set the effective date for any regulations that EPA develops relating to existing power plants.

I would like to thank my good friend Senator Manchin for appearing before us today and for working with me on this commonsense alternative. Make no mistake—EPA's proposed GHG New Source Performance Standards would effectively ban new coal-fired generation. It would essentially require carbon capture and storage technologies, which are nowhere close to being commercially viable. Even Charles McConnell, former Assistant Secretary for Fossil Energy in the Obama administration, recently testified before Congress that it is "disingenuous" to say that CCS is ready.

And while EPA moves to finalize a rule that would spell the end of new coal-fired generation, it has also pledged to finalize regulations that go after existing sources—a one-two punch to eliminate coal as a source of electricity.

Now, I might add that some still claim that there is no direct attack on coal or fossil fuels in general. They argue that coal-fired power plant shutdowns are occurring simply because natural gas is cheaper, and that coal is a victim of nothing more than market forces. But if that was truly the case, one wonders why the Obama EPA feels the need to keep issuing rules that are nowhere close to being achievable by coal-fired power plants. In reality, while the increase in domestic natural gas production is in itself good news for our economy, this nation still needs a diversity of supply that also comes from coal and nuclear as well as renewable sources of electricity. The generation mix varies greatly across the country based on what makes sense locally, including my part of the country in Kentucky which relies heavily on coal.

America has the world's largest coal resources, and EPA's pending regulations to phase out or eliminate the use of coal for both new and existing power plants poses extreme risks for jobs, energy reliability, and energy security. And these regulations threaten to drive up electric bills in coal-reliant states and restrict access to energy for many Americans. We should be pursuing energy policies that will lead to more energy that is less expensive for people, rather than less energy that is more expensive for people. And this decision should be left with the American people, not with EPA to decide.

Further, many of our largest industrial competitors, including China, have been rapidly adding coal to their generation portfolio, and for good reason given its low cost and reliable performance. And none of these nations are imposing on them-

selves anything like EPA's anti-coal agenda. The global economy is sending us a clear message—the more we handicap American coal, the more we handicap American competitiveness.

Prior to the Obama administration, the EPA and states had a decades-long history of regulating coal in ways that reduced emissions without abandoning this vital energy source. And I believe that Sen. Manchin and I have tapped into that tradition of realistic and achievable regulation with our draft legislation. Our bipartisan and bicameral proposal is the commonsense way to ensure that any greenhouse gas regulations for power plants going forward are achievable.

I would conclude by noting that this hearing is about what energy policy makes sense for the American people. We need to keep the lights on and the bills low while creating badly needed jobs. And it won't happen without coal.

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Mr. WHITFIELD. At this time I would like to recognize the gentleman from California, Mr. McNerney, for his 5 minute opening statement.

OPENING STATEMENT OF HON. JERRY MCNERNEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MCNERNEY. Thank you, Mr. Chairman. It is a little chilly in here this morning, so maybe we should turn on the coal-fired power plants and get things warmed up.

You know, I am glad we are having this hearing, but I want to make clear that this hearing is about climate change. The legislation focuses on the Whitfield bill. The draft legislation would block EPA's ability to issue standards to limit carbon pollution from new and existing coal-fired power plants. It effectively rolls back EPA's authority under the Clean Air Act. The legislation nullifies EPA's proposed carbon standards for new power plants and prohibits future standards from being implemented unless at least six units at different locations have met that standard for 12 continuous months. It is not clear why utilities would deploy any carbon pollution control technology in the absence of a requirement to do so. As a result, the bill's requirements appear to be insurmountable. In addition, the bill would require Congress to pass new legislation before the EPA could limit carbon pollution from existing power plants.

Greenhouse gases pose a significant threat to our economy, to our public health, and to the environment. We have heard time and again from the world's leading scientists that greenhouse gases have negative consequences, and are causing global warming. I share the view of many of my colleagues, that we need a comprehensive approach to our nation's energy needs. Coal can continue to play an important role, but we must address carbon emissions.

California still relies on coal powered plants for some of its energy needs. However, California has been a national leader in clean energy generation, and in reducing greenhouse gases. A Republican governor established short and long term greenhouse gas emission reduction targets for California, to reduce carbon emissions to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The State's carbon emissions have declined for 3 straight years.

The development of carbon capture and storage technologies is essential to the future of coal. The International Energy Agency expects carbon capture and storage to rank third among ways to reduce carbon emissions by 2050, behind energy efficiency, and the use of renewable sources, and ahead of nuclear power. As far back as 2009, industry stakeholders were talking about the benefits of carbon capture and sequestration. Although work remains to be done on carbon capture and sequestration, I believe that the current technological capacity exists to effectively deploy CCS technology on power plants. Taking away incentives for implementation of carbon capture and sequestration will stunt the progress that has been made in this industry to this point. We saw a similar scenario play out in the wind industry back in the 1990s, that I was involved in. The United States was building new technology, and was leading the charge, but proper support went away, and so did the jobs and the technology. I saw those jobs leave this country. That set our industry back for years.

As I said at the beginning of my opening statement, this hearing is about climate change. Either we believe that climate change is happening, and is caused by human activities, or we don't. If we do believe that climate change is happening, this bill is exactly the wrong way to go.

I want to thank the witnesses for their time, and I look forward to their testimony, and I am interested to hear how we can support efforts to reduce greenhouse gases, while boosting energy independence, and protecting public health.

Thank you, Mr. Chairman. I yield back.

Mr. WHITFIELD. Thank you, Mr. McNerney. At this time recognize the gentleman from Michigan, Mr. Upton, for 5 minutes.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Well, thank you, Mr. Chairman.

You know, nearly everyone claims to support an all-of-the-above energy strategy, everybody. And, in my view, all-of-the-above allows every viable energy resource to compete. It doesn't take certain options off the table by setting unachievable Federal regs. Unfortunately, it is the latter that has been on display by the EPA. EPA's proposed greenhouse gas rule for new power plants is the latest effort by this administration to eliminate the use of coal. The President's energy strategy is the exact opposite of an all of the above approach, and would limit our energy choices, jeopardize jobs, raise energy costs, and threaten America's global competitiveness.

An open all-of-the-above energy strategy is important because diversity of energy is critical to providing affordable and reliable electricity to U.S. homes and businesses. The nation has, for decades, benefitted from a variety of sources of electricity. The idea that electricity from coal is no longer needed because we have more natural gas is misguided. And, while our Nation has become the envy of the world because of recent breakthroughs unlocking vast amounts of oil and natural gas, it never makes sense to regulate an entire fuel category out of the mix. It makes even less sense when the resource makes up 40 percent of the fuel used for elec-

tricity domestically, while at the same time other nations, from Germany to China, are continuing to build new state-of-the-art coal facilities.

Given that the U.S. has the largest coal reserves, and is the largest producer of coal, it should remain a critical contributor to a diverse electricity portfolio for decades to come. Fuel diversity not only gives us the flexibility we need to keep electricity costs low, it also helps ensure reliability. As we have heard from many witnesses in previous hearings, the coal-fired power plant shutdowns already underway pose a serious threat to reliability in many regions, particularly in the Midwest. That threat will continue to get worse if these shutdowns increase in the years ahead while we limit our options for new base load power.

In sum, fuel diversity gives us a more stable, reliable, affordable electricity supply, and any threat to coal, including the EPA's proposed rule, is a threat to that diversity. I want to applaud both Chairman Whitfield and Senator Manchin from West Virginia for their efforts in authoring a workable bipartisan, and bicameral, alternative to EPA's proposed rule. Their proposal is a good faith effort that requires a critical check on EPA's misuse of the Clean Air Act to try and accomplish through regulation what was rejected in Congress through legislation. Their approach does not prohibit the EPA for setting the standard for new sources, but instead focuses on setting standards that have been adequately demonstrated at geographically diverse locations around the country, a key ingredient that is missing from EPA's regulatory proposal. It deserves serious consideration by this committee and Congress.

And I yield back my time.

[The prepared statement of Mr. Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON

Nearly everyone claims to support an all-of-the-above energy strategy. In my view, all-of-the-above allows every viable energy resource to compete. It does not take certain options off the table by setting unachievable federal regulations. Unfortunately, it is the latter that has been on display by the Environmental Protection Agency.

EPA's proposed greenhouse gas rule for new power plants is the latest effort by the Obama administration to eliminate the use of coal. The president's energy strategy is the exact opposite of an all-of-the-above approach and would limit our energy choices, jeopardize jobs, raise energy costs, and threaten America's global competitiveness.

An open, all-of-the-above energy strategy is important because diversity of energy is critical to providing affordable and reliable electricity to U.S. homes and businesses. The nation has for decades benefitted from a variety of sources of electricity.

The idea that electricity from coal is no longer needed because we have more natural gas is misguided. While our nation has become the envy of the world because of recent breakthroughs unlocking vast amounts of oil and natural gas, it never makes sense to regulate an entire fuel category out of the mix. It makes even less sense when that resource makes up 40 percent of the fuel used for electricity domestically while at the same time other nations, from Germany to China, are continuing to build new state-of-the-art coal facilities.

Given that the United States has the world's largest coal reserves and is the largest producer of coal, it should remain a critical contributor to a diverse electricity portfolio for decades to come.

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Mr. WHITFIELD. Thank you, Mr. Upton. At this time I recognize the distinguished gentleman from California, Mr. Waxman, for 5 minutes.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Mr. Chairman.

The warning signs of climate change are happening all around us, but House Republicans are averting their eyes, denying the science, and jeopardizing the future of our children and grandchildren. Not only is this committee refusing to act, we are considering legislation to stop the administration from acting under existing law. The bill before us is a recipe for climate disaster.

Last week, the World Meteorological Association reported that the levels of heat trapping gases in the atmosphere set new records. The levels are now higher than at any time in the last 800,000 years. Direct measurements and basic physics tell us that carbon pollution is warming the planet.

Now, my Republican colleagues deny this scientific reality. I wish they would open their eyes and escape their congressional bubble. In my state, firefighters know that wildfires are getting bigger and more dangerous as heat and drought become more common. Across the West, foresters are grappling with dying forests, killed by bark beetles that thrive in warmer temperatures. Farmers know the weather better than anyone else, and they say it is different now. Coastal communities confront ever-rising sea levels, putting them at risk from extreme storms and ever higher storm surges. And just last week a super typhoon, perhaps the strongest ever recorded, demolished entire cities in the Philippines. Extreme weather, sea level rises, heat waves, droughts, floods, wildfires, pests. This is what climate change looks like.

So what is this committee doing today? Denying, obstructing, and weakening the Clean Air Act. We will hear charges today that the administration is waging a war on coal. We will hear claims that EPA's rules will block all new coal-fired power plants. We will be told that we must pass legislation to effectively repeal EPA's existing authority to address carbon pollution from power plants under the Clean Air Act. And we will be told this is a reasonable middle ground.

But we will hear no recognition of the dangers from climate change, much less any suggestions for dealing with it. EPA's approach is actually very reasonable. For existing coal-fired power plants, EPA is starting by listening to stakeholders. EPA hasn't yet issued a proposal. For new coal-fired plants, EPA proposes to require partial use of carbon controls that are technically feasible, have been used in other industrial applications for years, and have been demonstrated on existing power plants. Several full scale commercial applications of carbon capture at coal-fired power plants are currently under construction.

Of course, these controls are more expensive than dumping carbon pollution into the air. That is why industry will never deploy them without government incentives or requirements.

If this committee is truly concerned about the future of coal, it should be doing everything possible to advance the carbon capture technologies. That is the path to continued use of coal in a carbon constrained world.

That is exactly what Democrats tried to do. In 2009 the Waxman-Markey bill gave utilities certainty about carbon regulation. It gave utilities with more coal generation extra allowances to help defray their costs. And it provided \$60 billion, \$60 billion, to deploy carbon capture technology. That bill provided a future for coal. We worked with Representative Boucher, the coal miners, the utility industry, to make sure of that.

But House Republicans said no.

In the Recovery Act, President Obama provided \$3.4 billion for carbon capture and storage technology. But House Republicans said no.

So I ask my Republican colleagues, if you don't like President Obama's approach, if you don't like congressional Democrats' approach, what is your plan for dealing with climate change? Just saying no, pretending it doesn't exist, is just a recipe for climate disaster.

Yield back my time.

Mr. WHITFIELD. Thank you, Mr. Waxman, and that completes the opening statements. And we have this morning three panels of witnesses, and on the first panel we are delighted to welcome Senator Joe Manchin of the great State of West Virginia, and he will be our first witness. Senator Manchin is on the Energy and Natural Resources Committee, and he is also chairman of the Public Lands, Forest, and Mining Subcommittee. And I know you are on a lot of other committees as well, Senator, but we welcome you, and thank you for taking time to join us this morning.

And I will say that when Senator Manchin finishes his statement, he has got to get over to a confirmation hearing, so I know that you all will be disappointed you can't ask him any questions.

But, Senator Manchin, you are recognized for 5 minutes.

**STATEMENT OF HON. JOE MANCHIN, A UNITED STATES
SENATOR FROM THE STATE OF WEST VIRGINIA**

Senator MANCHIN. Thank you for inviting me, and having me be part of this. My colleague from West Virginia, Congressman McKinley, good to be with you. And I want to, first of all, say that I do believe that seven billion people on Mother Earth has had an

impact on the environment. We have a responsibility. We also have seven billion people that would like to eat and provide for themselves, and their families, so we have got to find that balance.

The EPA regulation of greenhouse gas emissions from both new and existing power plants are what we are talking about in this legislation that we proposed. Our legislation would protect Americans' access to reliable and affordable electricity now, and for decades to come, finding that balance we talk about. We need a diverse energy portfolio, which, I think, Mr. Upton, you have talked about, and we sure do need that, a true all of the above mix of natural gas, nuclear, renewables, oil, and coal. Unfortunately, the Environmental Protection Agency has chosen a regulatory path devoid of common sense that will take us way off course from a future of abundant, affordable clean energy. Our legislation tries to get the EPA back on track, but in a way that does nothing to prevent the EPA from acting in a reasonable and rational way.

Mr. Chairman, EPA's proposed standards for new coal-fired power plants would effectively prevent any new plants from being constructed. Their standards require coal-fired power plants to deploy technologies that are not currently commercially viable. And though EPA has yet to formally propose new standards for existing power plants, there is every indication that these standards will be unachievable as well. The EPA is holding the coal industry to impossible standards. And, for the first time ever, the Federal Government is trying to force an industry to do something that is technologically impossible to achieve, at least for now. The industry is making steady progress, but is still a ways off from developing the carbon capture and storage technologies that the EPA claims are commercially viable. We don't have a commercially viable plant right now.

Right now coal provides 37 percent of all electricity generated in the United States, and the Department of Energy projects coal will provide at least that much through 2040. Right now we simply can't make up the difference with renewables. That is just wishful thinking. So if we just stand by and do nothing, and let the EPA eliminate coal from the energy mix, we are going to see stability of our electrical grid threatened, and see the price of electricity rise dramatically, jeopardizing America's economy and countless jobs, with no real environmental benefit, but we are just standing by.

Our bipartisan, bicameral legislation is part of a national discussion about our energy future and the proper role of regulatory bodies like the EPA. Our legislation ensures that EPA will no longer be able to impose unachievable standards on coal-fired power plants. It is just common sense that regulations are based on what is technologically possible at the time they are proposed. With regulations, if they aren't feasible, they aren't reasonable.

For new plants, our legislation will require that any EPA regulation must be categorized by fuel type, coal, or gas. The EPA can only impose a standard if that standard has been achieved for 12 consecutive months at six different U.S. electricity generating plants, operating on a full commercial basis. For existing plants, any EPA proposed rule will not take effect until Federal law is enacted specifying the rule's effective date, and EPA must report to Congress on the economic impact of the rule.

Mr. Chairman, it is time we strike a balance between healthy environment and a healthy economy. That is all we have asked for, is a balance, and that is what our legislation does. Abundant, reliable, affordable energy made this country the economic leader of the world. We all wouldn't enjoy the life we have today if it had not been for the coal, when produced by the hardworking people of this country. And that is the same formula that will keep us up at the front. It is time the EPA started working as our partner, not as our adversary, to achieve that balance. And the EPA can start by recognizing it is just common sense that regulations should be based on what is technologically possible at the time they are proposed. That is all we have asked for.

Again I want to thank you, Mr. Chairman, and all the members of the committee here for allowing me to come before you, and thank you for the opportunity to work with you on this very important piece of legislation.

[The prepared statement of Senator Manchin follows:]

TESTIMONY**HOUSE SUBCOMMITTEE ON ENERGY AND POWER**

Mr. Chairman, thank you for the opportunity to testify in support of our draft legislation, which addresses EPA regulation of greenhouse gas emissions from both new and existing power plants. Our legislation would protect Americans' access to reliable and affordable electricity now and for decades to come.

We need a diverse energy portfolio— a true “all-of-the-above” mix of natural gas, nuclear, renewables, oil and coal. Unfortunately, the Environmental Protection Agency has chosen a regulatory path devoid of common sense that will take us way off course from a future of abundant, affordable, clean energy. Our legislation tries to get the EPA back on track, but in a way that does nothing to prevent the EPA from acting in a reasonable, rational way.

Mr. Chairman, EPA's proposed standards for new coal-fired power plants would effectively prevent any new plants from being constructed. Their standards require coal-fired power plants to deploy technologies that are not currently commercially viable. And though EPA has yet to formally

propose new standards for existing power plants, there is every indication that these standards will be unachievable as well.

The EPA is holding the coal industry to impossible standards. And for the first time ever, the federal government is trying to force an industry to do something that is technologically impossible to achieve – at least, right now.

The industry is making steady progress but is still a ways off from developing the carbon capture and storage technologies that the EPA claims are commercially viable.

Right now, coal provides 37 percent of all the electricity generated in the United States, and the Department of Energy projects coal will provide at least that much through 2040. Right now, we simply can't make up the difference with renewables. That's just wishful thinking.

So, if we just stand by and do nothing and let the EPA eliminate coal from our energy mix, we're going to see the stability of our electrical grid threatened and see the price of electricity rise dramatically, jeopardizing America's economy and countless

jobs with no real environmental benefit. But we aren't just standing by.

Our bipartisan, bicameral legislation is a part of a national discussion about our energy future and the proper role of regulatory bodies like the EPA.

Our legislation ensures that the EPA will no longer be able to impose unachievable standards on coal-fired power plants. It is just common sense that regulations are based on what is technologically possible at the time they are proposed. With regulations, if they aren't feasible, they aren't reasonable.

For new plants, our legislation will require that any EPA regulation must be categorized by fuel type – coal or gas. EPA can only impose a standard if that standard has been achieved for 12 consecutive months at six different US electricity generating plants operating on a full commercial basis.

For existing plants, any EPA proposed rule will not take effect until a federal law is enacted specifying the rule's effective date. And EPA must report to Congress on the economic impact of the rule.

Mr. Chairman, it's time we strike a balance between a healthy environment and a healthy economy. And that's what our legislation does. Abundant, reliable, affordable energy made this country the economic leader of the world – and that's the same formula that will keep us at the front.

It's time the EPA started working as our partner, not our adversary, to achieve that balance. And the EPA can start by recognizing it is just common sense that regulations should be based on what is technologically possible at the time they are proposed.

Again, thank you, Mr. Chairman, for this opportunity to appear before your committee. And thank you for the opportunity to work with you on this very important piece of legislation.

Mr. WHITFIELD. Well, Senator Manchin, thank you so much for your testimony. I know all of us look forward to working with you as we move forward, and we appreciate very much your taking time to come over and visit us on the House side.

Senator MANCHIN. Well, it is good to be with you.

Mr. WHITFIELD. Thank you so much.

Senator MANCHIN. Thank you.

Mr. DINGELL. Mr. Chairman, I would just like to say welcome to Senator Manchin. Welcome.

Senator MANCHIN. Thank you, my friend.

Mr. DINGELL. I am delighted to see you in the committee this morning.

Senator MANCHIN. Thank you, Mr.——

Mr. DINGELL. Thank you, sir.

Senator MANCHIN. Thank you, Mr. Dingell. You are my friend, I appreciate it. Thank you.

Mr. WHITFIELD. Thank you, Mr. Dingell.

At this time I would like to call our second panel, and our second panel consists of one person, and that is the Honorable Janet McCabe, who is the Acting Assistant Administrator for Air and Radiation at the Environmental Protection Agency. And I just discovered, in talking to her before the hearing, that she has a travel schedule like many of us do. She lives in Indiana and travels back and forth to Washington. So, Ms. McCabe, thank you very much for joining us today to talk about the proposed greenhouse gas regulation, and maybe the discussion draft, and you are recognized for 5 minutes for an opening statement.

STATEMENT OF HON. JANET MCCABE, ACTING ASSISTANT ADMINISTRATOR FOR AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. MCCABE. Well, thank you, Mr. Chairman, and members of the subcommittee. Thank you for the opportunity to testify today on EPA's recently issued proposed carbon pollution standards for new power plants and the related discussion draft under consideration in the committee.

Responding to climate change is an imperative——

Mr. WHITFIELD. Is your microphone on, Ms. McCabe?

Ms. MCCABE. The green light is on.

Responding to climate change is an imperative that presents both an economic challenge and an economic opportunity. As President Obama and Administrator McCarthy have underscored, both the economy and the environment must provide for current and future generations. We can and must embrace cutting carbon pollution as a spark for business innovation, job creation, clean energy, and broad economic growth.

In June President Obama issued a national climate action plan, which directs EPA and other Federal agencies to take steps to mitigate the current and future damage caused by greenhouse gas emissions, and to prepare for the climate changes that have already been set in motion. A key element of the plan is addressing carbon pollution from new and existing power plants. Power plants are the single largest source of carbon pollution in the U.S., accounting for about $\frac{1}{3}$ of U.S. emissions. In March 2012, EPA first

proposed carbon pollution standards for future power plants, and after receiving 2.7 million comments, we determined to issue a new proposed rule based on this input and updated information.

In September EPA announced its new proposal. The proposed standards would establish the first uniform national limits on carbon pollution from future power plants. They will not apply to existing power plants. The proposal sets separate national limits for new natural gas fired turbines, and new coal-fired units. The standards reflect the demonstrated performance of efficient lower carbon technologies that are currently being constructed today. They set the stage for continued public and private investment in technologies, like efficient natural gas, and carbon capture and storage. The proposal is currently available to the public, and the formal comment period will begin when the rule is published in the Federal Register. We look forward to robust engagement on the proposal, and will carefully consider the comments and input we receive as a final rule is developed.

For existing plants, we are engaged in outreach now to a broad group of stakeholders who can inform the development of proposed guidelines, which we expect to issue in June of 2014. These guidelines will provide guidance to states, which have the primary role in developing and implementing plans to address carbon pollution from the existing plants in their states.

In addition to the proposed carbon pollution standards, I have been asked to provide testimony on the discussion draft that has been put forward by Chairman Whitfield and Senator Manchin. Although the administration does not currently have a position on the draft, I will offer a few points that I hope will assist the committee in its deliberations. The draft bill would delay action and regulatory certainty for future power plants by repealing the pending proposed carbon pollution standards. Further, it would indefinitely delay progress in reducing carbon pollution by discouraging the adoption of innovative technology that is available and effective today, and would limit future development of cutting edge technologies. The draft bill could also prevent timely action on the largest source of carbon pollution in the country, the power sector, by prohibiting EPA rules from taking effect until Congress passes legislation setting the effective date of the rules.

For over 40 years State and Federal regulators have worked with stakeholders under the Clean Air Act to substantially reduce pollution through the development of cutting edge technologies. Addressing carbon pollution under the Clean Air Act will not be any different.

Thank you again for the opportunity to testify on this important subject, and I look forward to answering your questions.

[The prepared statement of Ms. McCabe follows:]

**Opening Statement of Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency**

**Hearing on EPA's Proposed GHG Standards for New Power Plants and
H.R. __, Whitfield-Manchin Legislation
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
November 14, 2013**

Chairman Whitfield, Ranking Member Rush, members of the Subcommittee: Thank you for the opportunity to testify today on EPA's recently issued proposed carbon pollution standards for new power plants and the related discussion draft under consideration in the Committee. Although the Administration does not currently have a formal position with regard to the draft legislation, we do have serious concerns and in my testimony I will make several points that I hope will assist the Committee in its consideration of the draft.

Climate change is one of the greatest challenges of our time. If unchecked, it will have devastating impacts on the United States and the planet. Reducing carbon pollution is critically important to the protection of Americans' health and the environment upon which our economy and security depend.

Responding to climate change is an imperative that presents both an economic challenge and an economic opportunity. As President Obama and Administrator McCarthy have underscored, both the economy and the environment must provide for current and future generations. We can and must embrace cutting carbon pollution as a spark for business innovation, job creation, clean energy and broad economic growth.

In June, President Obama issued a national Climate Action Plan, which directs the EPA and other federal agencies to take steps to mitigate the current and future damage caused by greenhouse gas emissions and to prepare for the climate changes that have already been set in motion. A key element of the plan is addressing carbon pollution from new and existing power plants.

Power plants are the single largest source of carbon pollution in the United States, accounting for about a third of U.S. emissions. In March 2012, the EPA first proposed carbon pollution standards for future power plants. After receiving over 2.7 million comments, we determined to issue a new proposed rule based on this input and updated information.

In September, the EPA announced its new proposal. The proposed standards would establish the first uniform national limits on carbon pollution from future power plants. They will not apply to

existing power plants. The proposal sets separate national limits for new natural gas-fired turbines and new coal-fired units. New large natural gas-fired turbines would need to emit less than 1,000 pounds of CO₂ per megawatt-hour, while new small natural gas-fired turbines would need to emit less than 1,100 pounds of CO₂ per megawatt-hour. New coal-fired units would need to emit less than 1,100 pounds of CO₂ per megawatt-hour. Operators of these units could choose to have additional flexibility by averaging their emissions over multiple years to meet a somewhat tighter limit.

The standards reflect the demonstrated performance of efficient, lower carbon technologies that are currently being constructed today. They set the stage for continued public and private investment in technologies like efficient natural gas and carbon capture and storage. The proposal is currently available to the public and the formal public comment period will begin when the rule is published in the Federal Register. We look forward to robust engagement on the proposal and will carefully consider the comments and input we receive as a final rule is developed.

As noted, the proposed rule would apply only to future power plants. For existing plants, we are engaged in outreach to a broad group of stakeholders who can inform the development of proposed guidelines, which we expect to issue in June of 2014. These guidelines

will provide guidance to States, which have the primary role in developing and implementing plans to address carbon pollution from the existing plants in their states. We recognize that existing power plants require a distinct approach, and this framework will allow us to capitalize on state leadership and innovation while also accounting for regional diversity and providing flexibility.

The EPA's stakeholder outreach and public engagement in preparation for this rulemaking is extensive and vigorous. We held eleven public listening sessions around the country at EPA regional offices and our headquarters in Washington, DC. We are convening or participating in numerous meetings with a broad range of stakeholders across the country. And all of this is happening well before we propose any guidelines. When we issue proposed guidelines next June, the more formal public process begins – including a public comment period and an opportunity for a public hearing – which will provide yet further opportunity for stakeholders and the general public to provide input.

* * * * *

In addition to the proposed carbon pollution standards, I have also been asked to provide testimony on the discussion draft that is the subject of this hearing. Although the Administration does not currently have a position on the draft, we do have serious concerns and I will offer a few points that I hope will assist the Committee in its

deliberations. The draft bill would repeal the pending proposed carbon pollution standards discussed above, delaying action and regulatory certainty on future power plants. Further, it would require the EPA to base any new carbon standards for future power plants solely on the performance of specified numbers and types of existing power plants. Such a requirement would stifle progress in reducing carbon pollution by discouraging the adoption of innovative technology that is available and effective today – and would limit further development of cutting-edge clean energy technologies. Finally, the draft bill could indefinitely delay cutting carbon pollution from existing power plants by prohibiting EPA rules from taking effect until Congress passes legislation setting the effective date of the rules. This, in turn, would prevent timely action on the largest source of carbon pollution in the country, the power sector.

* * * * *

President Obama's Climate Action Plan provides a roadmap for federal action to meet the pressing challenge of a changing climate – promoting clean energy solutions that capitalize on American innovation and drive economic growth and providing a role for the full range of fuels, including coal and natural gas. EPA's proposed carbon pollution standards for power plants are one important element of this plan and we look forward to incorporating public and stakeholder input in the development of the final standards.

Thank you again for the opportunity to testify on this important subject, and I look forward to answering your questions.

Mr. WHITFIELD. Well, Ms. McCabe, thanks very much for being here, as I said, and thanks for your testimony. We will now have questions for you, and I will recognize myself for 5 minutes for the first questions.

First of all, this legal term, adequately demonstrated, what is your definition of adequately demonstrated?

Ms. MCCABE. Well, thank you for the question, Mr. Chairman. The EPA, in developing new source performance standards, which we have done, many, many times under the Clean Air Act, does a broad review of what technologies are available, feasible, in use, and being developed. Indeed, that is one of the elements of Section 111 of the Clean Air Act, is that the new source performance standards, which apply to plants that are to be built in the future, are to encourage new cutting edge and innovative technology. So we look at the broad range of technologies that are out there. And, in this case, we looked at the types of technologies that were being used for the newest generation of clean power plants that are being built, clean natural gas, and—

Mr. WHITFIELD. But you—

Ms. MCCABE [continuing]. Coal technology.

Mr. WHITFIELD. But you think the projects that you all have identified would adequately demonstrate that the technology is available?

Ms. MCCABE. That is what our proposal lays out.

Mr. WHITFIELD. Now, even though my recollection is the Federal Government provided about \$1.4 billion for those three projects, that are all in enhanced oil recovery areas, and there are all cost overruns on them, and none of them are completed. So how can you issue a regulation that would dramatically change the possibility of even building a plant on such speculative processes?

Ms. MCCABE. Well, with respect, I wouldn't refer to these as speculative technologies. Carbon capture and sequestration has been used in industrial applications for many years.

Mr. WHITFIELD. But is it commercially available?

Ms. MCCABE. It is commercially available—

Mr. WHITFIELD. Where.

Ms. MCCABE [continuing]. And there are?

Mr. WHITFIELD. Where is the project, then?

Ms. MCCABE. There are four projects underway. Two of them are significantly—

Mr. WHITFIELD. Have they been completed?

Ms. MCCABE. They are very close to completion, $\frac{3}{4}$ of the way—

Mr. WHITFIELD. Do you know when they will be completed?

Ms. MCCABE. My understanding is that the two that are under construction now are expected to begin operation in 2014.

Mr. WHITFIELD. And where are they located?

Ms. MCCABE. There is the Kemper plant—

Mr. WHITFIELD. And all of them have government money involved in them. Well, we just have some fundamental disagreements on this, and that is why we have hearings. And let me ask you this question. I read repeatedly that the carbon dioxide emissions in America are the lowest that they have been in 20 years,

which I think speaks well of the Clean Air Act, speaks well of the efforts that you all are making.

But, America, we don't have to take a back seat to any country in the world on the great progress that we have made in cleaning up the environment. So if you were at a Rotary Club, and someone, like, asked me the question the other day, why is it that in America, with the great success that we have had, and the lowest emissions in 20 years, why are we unilaterally saying to ourself that you can't build a new coal plant in America?

Ms. McCABE. Well, we are not saying you can't build a new coal plant in America. We are, in fact, providing a path——

Mr. WHITFIELD. Well, look, let me just say, natural gas prices are very low, so no one is interested in building a plant right now. But if they wanted to, people tell us they would not do it because they cannot meet these requirements. And that is one of the fundamental differences that we have. Just like I mentioned, in Europe, they are closing down 30 gigawatts of natural gas, and they are going to coal. Why should we remove that option here in America? We have a 250 year reserve of coal. It doesn't mean that they are going to be built immediately, but if the circumstances change, why shouldn't we be able to do that? Right now we would not be able to do it.

Ms. McCABE. We agree absolutely that there needs to be a clear path for coal. Coal is the largest source of energy in the country now. We expect it to continue to be. There are four projects underway that are going forward that would use this technology. So coal plants are moving forward.

Mr. WHITFIELD. Have you ever had meetings with the President? I mean, have you ever heard him discuss when he made that comment how I'll bankrupt the coal industry—have you ever had a discussion with him about that?

Ms. McCABE. I was not in discussions——

Mr. WHITFIELD. OK.

Ms. McCABE [continuing]. With the President about that.

Mr. WHITFIELD. You know, I will make one other comment. In 1965 coal, worldwide, provided 93 percent of the electricity. 2013, coal provides 87 percent of the worldwide electricity. So it is quite obvious that, while renewables are important, the base load is going to have to be fossil fuels. Well, thank you very much, Ms. McCabe. I look forward to continuing our discussion and working with you on these issues.

At this time I recognize the gentleman from California, Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Ms. McCabe, are there any coal-fired power plants in the U.S. that don't receive any sort of government money?

Ms. McCABE. Any coal plants in the country that don't receive any federal——

Mr. MCNERNEY. Any——

Ms. McCABE [continuing]. Money?

Mr. MCNERNEY [continuing]. Kind of government money at all. Are there any in the country?

Ms. MCCABE. I don't know that I know the answer to that question. There are some coal plants that are receiving government money, but I can't speak for every coal plant in the country.

Mr. MCNERNEY. Well, I would say that it is virtually impossible, given what the legislation proposes, for coal-fired power plants to use CCS equipment that aren't receiving some sort of government subsidy, so I think the bill makes it impossible for EPA to require that in the future.

Ms. MCCABE. What I will say is that the history has been that, as new technologies are developed, they often receive government subsidies, and that is an important role the government can play in encouraging research and development of new technologies that then become part of the mainstream.

Mr. MCNERNEY. Well, thank you. The coal industry, and critics of the EPA's efforts to control carbon pollution from power plants are saying that carbon capture and storage technology is not feasible. We keep hearing that it isn't ready, and won't be for years, but that is contrary to the evidence. The coal industry was saying something very different just four years ago, back in 2009. When the House passed an energy bill that would have set limits on carbon pollution and requiring CCS, the coal industry was running ads about how CCS was the future of coal. Let me show you an example. Here is a 2010 television ad from the Consol Energy, one of the biggest coal companies in the country.

[Video shown.]

Mr. MCNERNEY. In light of that ad, what do you think the outlet for carbon capture and sequestration storage technology is?

Ms. MCCABE. Based on the information that we reviewed and have laid out in our proposal, it is clear that carbon capture sequestration technology is available, is feasible. It has been used in applications for many years. It is going forward with commercial scale coal plants, so we see carbon capture and sequestration as being a future technology that will be very much in use.

Mr. MCNERNEY. So was that ad correct in saying that the industry was using CCS technology four years ago?

Ms. MCCABE. There have been industry applications of CCS for many years.

Mr. MCNERNEY. Well, is carbon capture and storage technology going to be widely deployed in the United States in the absence of a requirement to use it, or other strong policy driver?

Ms. MCCABE. The history of development of technologies in the power sector, and in many other industrial sectors, with the new source performance standards, which put in place requirements based on the clean and forward looking technologies that this country is so good at inventing, that those then allow those technologies to become widespread, the cost to come down, and they become routine examples and standard equipment in the future.

Mr. MCNERNEY. What is your response to the argument that we should just wait for years, or even decades, before limiting the amount of carbon pollution that power plants can emit?

Ms. MCCABE. Well, as has already been stated by members of the committee, including yourself, climate change is a serious health threat to the citizens of this country, and, in fact, the world. And to delay the steps that we can take reasonably now would increase

the likelihood of significant health impacts, and would be failing to do what we can do now to reduce carbon emissions.

Mr. MCNERNEY. Well, thank you. If coal is going to have a long term future, carbon pollution from those plants must be reduced significantly, and carbon sequestration and storage is the only technology we have that can do that, is that right?

Ms. MCCABE. Well, that is the key technology for coal-fired power plants at this time, is carbon capture and sequestration.

Mr. MCNERNEY. OK. Thank you, Mr. Chairman. I yield.

Mr. WHITFIELD. Thank you. At this time recognize the gentleman from Louisiana, Mr. Scalise, for 5 minutes.

Mr. SCALISE. Thank you, Mr. Chairman. I appreciate you having this hearing, and I appreciate Senator Manchin being here earlier, as well as you, Ms. McCabe, coming here to testify. I think it is very clear that the Obama administration has a war on coal, and I think their objectives have been stated over the years, in terms of what they are trying to achieve, and I think that is unachievable goals that are designed to ultimately bankrupt the coal industry. We are seeing it across so many states with job losses, but also with increased energy costs. And, you know, when you talk about the impact on low income families, these high energy costs hit low income families the hardest.

And so, when the administration puts these policies in place, they are having real consequences negatively not only on our economy, but on families. So when we bring legislation like this in a bipartisan way, and, again, I commend the Chairman for bringing this bill, but also the Senator as well, because it shows that there is bipartisan interest in ending this war on coal and getting back to an economy that can function using all of the available tools that we have, including coal, that is very low cost and very effective.

So when Senator Manchin says that, under our bill, EPA will no longer be able to impose unachievable standards, is there something about that that you disagree with? I mean, do you think you all should be able to impose the unachievable standards you have been imposing so far?

Ms. MCCABE. The standards that we have proposed, and that are out for public comment now, are achievable. They are based on technologies that are available and feasible, based on experience in the real world, and——

Mr. SCALISE. I don't necessarily think they are in the real world. You mentioned four examples you said that you all point to——

Ms. MCCABE. Yes.

Mr. SCALISE [continuing]. In terms of coal-fired power plants that are adequately demonstrated. What are those four examples?

Ms. MCCABE. The first is the Kemper plant, which is in Mississippi. It is about 75 percent complete. It is an IGCC plant.

Mr. SCALISE. I am familiar with that. We have had them testify. What are the other three, if you can run through those real quickly.

Ms. MCCABE. There is the Boundary Dam project in Saskatchewan. That is a 110 megawatt plant, pulverized coal plant. It is 75 percent complete. It is designed to capture 90 percent.

Mr. SCALISE. All right. Next one?

Ms. McCABE. The next one is the HECA plant in California, which is also designed to capture 90 percent. That is an IGCC plant as well. And the Texas Clean Energy Project, a 400 megawatt plant, also designed to capture 90 percent of the carbon.

Mr. SCALISE. Well, first let me start with the Kemper plant. You use the Kemper plant as one of your poster children for how CCS works so well. It is adequately demonstrated. We had the Kemper folks come and testify. Let me read you some of the statements. Because when you all introduced and announced your new coal-fired power plant rules, the Southern Company, making that plant, said, "Because the unique characteristics that make the project the right choice for Mississippi cannot be consistently replicated on a national level, the Kemper County energy facility should not serve as a primary basis for new emissions standards impacting all new coal-fired plants." The people building the plant are saying it is creating a lot of problems for them to build it this way, but it is saying it surely should not be used as some kind of national model. And yet you are sitting here saying you are using it as a national model, but the people building it are saying it shouldn't be used as a national model. First of all, are you aware that they have said that?

Ms. McCABE. Yes, I am.

Mr. SCALISE. Well, then why are you still using it as a national model?

Ms. McCABE. Well, with respect, Congressman, there are three other plants that are——

Mr. SCALISE. Well, this was the first one you listed, so I am going to start with this one. Kemper said, the other three I don't think have testified. Kemper has testified, and their testimony was they shouldn't be used as a national standard, and yet you are sitting here, using it as a national standard, and you know that they said they shouldn't be used as a standard. So why are you still using it?

Ms. McCABE. Well——

Mr. SCALISE. Scratch them off your list.

Ms. McCABE [continuing]. We don't base our rules on the thoughts and comments of one company. We——

Mr. SCALISE. Well, that was the first one you mentioned——

Ms. McCABE. Yes.

Mr. SCALISE [continuing]. And you said you are using real world examples. And the first real world example that you used, they have testified, saying that they shouldn't even be used as a standard. So you are not living in the real world. You are using an example where the people that you are citing have said they shouldn't be used as a national example because that doesn't replicate itself nationally. You should be talking about things that can actually be replicated in the real world for these standards to exist.

Let me ask you this, because I know the Chairman brought this up. You know, we have all heard the statement. I don't know if you have or not. The President, President Obama said, "So if somebody wants to build a coal powered plant, they can. It is just that it will bankrupt them." Do you agree with the President's statement that he made, that they can build a plant, but it will bankrupt them if they build it? Do you agree with that?

Ms. MCCABE. The——

Mr. SCALISE. And is that what you all are trying to achieve with these rules?

Ms. MCCABE. No. The Clean Air——

Mr. SCALISE. No?

Ms. MCCABE [continuing]. Act, over its history, has regulated the power sector, including coal-fired power plants, and claims that it would shut the lights off and skyrocket power prices have been made before, and have been demonstrated time and again not to be true.

Mr. SCALISE. So the President's claim is not true? Because the President made that claim. Yield back——

Mr. WHITFIELD. Gentleman's time has expired. At this time I recognize the gentleman from Michigan, Mr. Dingell, for 5 minutes.

Mr. DINGELL. Mr. Chairman, I thank you for that, and I commend you for this hearing. I want to make it clear that I agree with my colleague, Mr. Whitfield, that we should do something to provide clarity on how to regulate greenhouse gas emissions. However, the bill before us creates a peculiar and entirely new process for regulations under the Clean Air Act. I am afraid that this bill will take a long established and reasonable effective regulatory process, turn it upside down, to the great detriment to all of those in the industry, and who are seeking certainty.

Some questions for you, Ms. McCabe. First, I would like to have you answer a question I asked Administrator McCarthy and Secretary Moniz at a recent hearing on climate change. Do you see a future for coal as a viable energy source in light of the impending greenhouse regulations? Please answer yes or no.

Ms. MCCABE. Yes.

Mr. DINGELL. Now, this bill requires that no EPA rule applicable to existing coal-fired power plants may become effective unless and until the Congress acts to adopt a new law. Are you aware of any precedent for such provision in the Clean Air Act? Answer yes or no, if you would please?

Ms. MCCABE. No.

Mr. DINGELL. Now, the traditional approach is that Congress passes a law that directs a Federal agency to issue a regulation, meeting specific criteria. Congress retains its control over the result by exercising good old fashioned oversight. If we do not approve of the results, and the agency is unresponsive to Congress's vigorous exercise of its proper oversight authority, Congress may then pass a new law to provide further direction to the agency. This bill would, as a practical matter, eliminate the delegation of rulemaking authority to EPA, and set Congress up as a regulatory agency.

Now, Ms. McCabe, by the way, do you agree with that statement, that the bill would, as a practical matter, eliminate delegation, rulemaking authority to the EPA?

Ms. MCCABE. Yes.

Mr. DINGELL. Now, Ms. McCabe, in your view, would the approach in this bill be effective and workable for regulating carbon pollution from power plants, yes or no?

Ms. MCCABE. No.

Mr. DINGELL. Now, I tend to agree with you, since this bill proposes to change how EPA regulates greenhouse gas emissions, without amending the Clean Air Act itself. It seems that the only ideas in this subcommittee of— brought up before us is to block and indefinitely delay rules, and propose rules without providing any alternative solutions on how to address the problem at hand. Do you agree with that statement?

Ms. MCCABE. Yes.

Mr. DINGELL. Now, since becoming Acting Administrator, have you reached out to the stakeholders, including industry, and all different parts of the industry about components of the greenhouse gas rule, new and existing sources? Please—

Ms. MCCABE. Yes, we—

Mr. DINGELL [continuing]. Answer yes or no.

Ms. MCCABE. Yes, we have.

Mr. DINGELL. Would you submit for the record, not at this time, but just submit for the record what you have done? Now, I have always believed that we should build a consensus to create support for moving legislation forward. I once again offer to work with my colleagues on both sides to develop legislation dealing with greenhouse gas emissions that provides both clarity and certainty to industry and to regulators.

Sometimes things are done in a certain way for a reason. Sometimes history and experience have something to teach us. I would urge my friends here to attend to these lessons, and what we have learned from them, before leaping to the conclusion that a simplistic change will make things better. All too often I find that the radical approach proposed in the Congress of late will do nothing, except create confusion and problems, and it is my fear that this bill is one of such proposals that is going to cause us a lot of future difficulties.

I thank you for recognizing me, Mr. Chairman. I yield you back 48 seconds.

Mr. WHITFIELD. Thank you so much. I wish you would yield me that time to respond to you. At this time I recognize the gentleman from Texas, Mr. Barton, for 5 minutes.

Mr. BARTON. Mr. Chairman, I would be happy to let—

Mr. WHITFIELD. OK.

Mr. BARTON [continuing]. Mr. Shimkus go—

Mr. WHITFIELD. Mr. Shimkus of Illinois for 5 minutes.

Mr. SHIMKUS. I thank my friend, and it is very emotional, you know, and this is really the livelihood in a lot of our districts, so we have great concerns.

First of all, I hate to correct Mr. Dingell, or at least continue to set the record straight, but the Clean Air Act that he was involved with in the legislation, there were amendments offered to make sure that carbon dioxide was not considered a criteria pollutant. And it was only through a court case, and litigation, and then, I would argue, a failed endangerment finding by the EPA that we are even in this mess. So the process how we got here is not as clear as the Chairman Emeritus tends to portray in how legislation and regulation occurs.

The second point, to my friend in California, we do have power plants that receive no government subsidies, coal-fired power

plants. In fact, they pay local, State, Federal taxes. They have high wages, they have great benefits, they have economic development for rural America. So, if there is any thought that we have got coal-fired power plants that are getting government subsidies, it is only to try to implement a CCS standard, which brings me to the question.

The four CCS power plant projects that we have been talking about, and also in your EPA September 20 proposal, to support its claim that CCS for coal plants is adequately demonstrated, each are being built with hundreds of millions of dollars of government funding. Are any commercial scale CCS power plant projects going forward right now in the U.S. that aren't receiving government funding?

Ms. MCCABE. The four that we have referred to are the four that are going forward.

Mr. SHIMKUS. The question is, are there any commercial size—and that deals with the ad too, because that is not commercial size. Are there any commercial scale CCS power plant projects going forward right now in the U.S. that aren't receiving government funding?

Ms. MCCABE. Not that I am aware of, but the ones that are—

Mr. SHIMKUS. No. You are correct. Does EPA believe it is appropriate to rely on government subsidized demonstration projects to show that a technology is adequately demonstrated?

Ms. MCCABE. With respect, Congressman, I would not call these demonstration projects. These are commercial projects that are going forward, as has often—

Mr. SHIMKUS. OK. So the question is, do you think that if it is a government funded project, and then we are trying to see if it is commercially viable, do you think government subsidizing a project equates to commercially viable?

Ms. MCCABE. I do think that these plants are commercially viable. They intend to produce power and sell it.

Mr. SHIMKUS. But commercially viable also talks about the cost and benefit, and the capital investment, and the risk assumed in the cost for selling the commodity product. So, if the Federal Government is subsidizing that, how in the world can the Federal Government, an agency that is not in a market system, make believe that they have the capitalistic model that says, with \$100 million plus of government subsidies, this is going to be a commercially viable project? How do you do that? It would be more like the Department of Commerce should probably have an evaluation than you all on the commercial viability.

Ms. MCCABE. As technology is developed, government subsidies often help. This is not the only circumstance—

Mr. SHIMKUS. Do you think that every coal-fired power plant will need millions of dollars of government subsidies on carbon capture and sequestration?

Ms. MCCABE. I do not think so.

Mr. SHIMKUS. And what is the basis of that analysis?

Ms. MCCABE. Experience, and information, and analysis from the Department of Energy, and other agencies—

Mr. SHIMKUS. The Kemper—

Ms. MCCABE [continuing]. Over time.

Mr. SHIMKUS. The Kemper facility is how much millions of dollars over budget?

Ms. MCCABE. I don't know.

Mr. SHIMKUS. It is about \$2 billion over budget. And how long has it been delayed because of this? You see our problem? Two things. You are saying the technology is available. We are saying it is not. We are running ads on demonstration projects that are small scale, and we are talking about large scale power plants. I have got a new power plant, 1,600 megawatts. To be able to capture carbon and put it in long term geological storage on small scale, yes, we can do that in advanced oil recovery. We can't do it in large scale.

And the administration is gaming the system to say that, because we have government subsidized power plants at millions of dollars, that it is commercially viable, is fraudulent, and it is very disappointing.

I yield back my time.

Mr. WHITFIELD. At this time recognize the gentleman from California, Mr. Waxman, for 5 minutes.

Mr. WAXMAN. Thank you, Mr. Chairman.

Since 1970, when President Nixon signed the Clean Air Act, we have had a law that had several key features that have helped make it one of the most successful environmental laws in the world.

Science-based, health protective standards keep our eyes on the prize, healthy air for everyone. Cooperative federalism allows EPA to set the clean air goals, and then the states decide how best to achieve them.

And the Clean Air Act uses regulatory standards to drive technological innovation in pollution controls, often called technology forcing standards. The Act recognizes that it usually costs less to dump pollution for free than to clean it up, so businesses generally don't control pollution absent regulatory requirements.

Ms. McCabe, could you give us some examples of how Clean Air Act standards have driven air pollution control technologies?

Ms. MCCABE. Certainly, Mr. Waxman. There are a couple of very appropriate examples that affect the power sector particularly. The first is the use of scrubbers. So when the new source performance standards, which is the same rule we are talking about here, were developed to require the use of scrubbers, they were not in widespread use. There were only a couple, in fact, out there, and since that time they have now become mainstream standard equipment on any new power plants.

Mr. WAXMAN. And those scrubbers have gotten better, haven't they?

Ms. MCCABE. They have gotten better. They have gotten—

Mr. WAXMAN. And cheaper?

Ms. MCCABE. And they have gotten cheaper, and they have brought improved public health to millions of American by reducing SO₂ substantially.

Mr. WAXMAN. So we know, from decades of experience, that the Clean Air Act drives innovations in pollution control. As you mentioned, scrubbers, but I know that there are others we could talk about—

Ms. MCCABE. Yes.

Mr. WAXMAN [continuing]. As well. It drives innovation in pollution controls, that then become the industry standard.

There is something else we have learned over the past 40 years. Almost every time EPA proposes a significant new requirement, industry tells us it can't be done. And I have been around all of these decades, and I have heard it over and over again. It will cost too much, it will destroy our economy, it will turn off the lights.

I am not going to show you, but I am going to tell you about an ad that the American Electric Power System ran in 1974, the year I was elected, opposing requirements for scrubbers to clean up sulfur dioxide. And it describes scrubbers as monstrous contraptions that clog the works and cause prolonged shutdowns, and would produce "a disposal nightmare." Is that what happened?

Ms. MCCABE. Not at all.

Mr. WAXMAN. The EPA proposed a requirement that we have these scrubbers, and you just mentioned it. They are now ubiquitous. They are the standard. They are cheaper, they are more effective. What did industry say when EPA proposed to require selective catalytic reduction to clean up nitrogen oxides, or activated carbon injection to control mercury, and how did those statements compare with what actually happened?

Ms. MCCABE. Those are similar examples, where there were widespread concerns that it was going to be very detrimental to the coal industry, and that has turned out not to be the case. In fact, industry has found cheaper and very reliable ways to control those pollutants.

Mr. WAXMAN. So once an air pollution standard is in place, American industry gets to work and meets it. And along the way we develop more effective and less expensive pollution control technologies. Not only is our air cleaner, but we export tens of billions of dollars of pollution control equipment all over the world. We have seen that happen over and over again.

But the Whitfield bill would eliminate EPA's ability to drive pollution control technology, rejecting an approach that has been successful for over 4 decades.

If this bill had been in effect in 1971, EPA could not have issued standards based on scrubber technology. Only two power plants, as you mentioned, had operating scrubbers at the time the 1971 rule was finalized. And if this bill were adopted now, EPA likely could never set a standard based on carbon capture and sequestration.

This bill is a radical rewrite of the Clean Air Act that would block any real reductions in carbon pollution from coal plants, and it ignores 40 years of experience.

I want to point out a couple things. There aren't criteria pollutants spelled out in the Clean Air Act, but the Clean Air Act requires EPA to deal with other pollutants as well, and that is not just this one, carbon, but others that are already being regulated. And to say that there is no subsidy for a power plant that spews pollution, and hurts the public health, and causes a great deal of damage, like we are seeing with climate change, that is a subsidy, because they don't have to pay for controlling their pollution, we all have to pay, in more harm to the climate, more harm to the planet, and more harm to our environment.

Thank you, Mr. Chairman.

Mr. WHITFIELD. Thank you. At this time recognize the gentleman from Texas, Mr. Barton, for 5—

Mr. BARTON. Thank you, Mr. Chairman, and I don't think it is news to the committee, but I am a co-sponsor of your legislation, and I hope we will move to—

Mr. WHITFIELD. Thank you very much.

Mr. BARTON [continuing]. Move towards a hearing, and hopefully a markup.

We are glad to have you. We are always glad to have our friends from EPA. Could you tell the subcommittee, to the best of your knowledge, are CO₂ emissions in the United States up or down?

Ms. MCCABE. Well, that is a relative question, Congressman. CO₂ emissions are significant from—

Mr. BARTON. I didn't ask the significance of them. I said are they going up or are they going down.

Ms. MCCABE. It depends on where you start. So they have been—

Mr. BARTON. Well, let us start from—

Ms. MCCABE [continuing]. Going—

Mr. BARTON [continuing]. Five years ago.

Ms. MCCABE. They have been going up significantly over time. In the most recent years there has been a reduction in—

Mr. BARTON. So they are going down?

Ms. MCCABE. There has been a recent reduction, but over time carbon emissions—

Mr. BARTON. They are going down?

Ms. MCCABE [continuing]. Are significant.

Mr. BARTON. You know that, and I know that. Which country is number one right now in CO₂ emissions, the United States, or China?

Ms. MCCABE. I believe it is China.

Mr. BARTON. You believe correctly. Could you tell me what the cost is per megawatt to build a new coal-fired plant under existing regulations, as compared to a combined cycle natural gas plant? Which is most cost effective right now, under current regulations?

Ms. MCCABE. I am sorry, I want to make sure I understand your question. I am comparing a—

Mr. BARTON. A state of the art—

Ms. MCCABE. Yes.

Mr. BARTON [continuing]. Natural gas fired power plant that is being built today, compared to a coal-fired power plant that could be built today under existing regulations. Which is the most cost effective per megawatt of output?

Ms. MCCABE. I believe, Congressman, and if I need to supplement, I certainly will, but, given the fuel prices today, the industry is building natural gas fired plants because they are—

Mr. BARTON. They are more cost effective?

Ms. MCCABE [continuing]. More cost effective.

Mr. BARTON. Yes. You get more output, less input, and the CO₂ emissions are approximately half that of a coal-fired plant. Could you tell today what the cost of construction of a coal-fired power plant is today? Do you know that number?

Ms. MCCABE. I don't know that number, Congressman.

Mr. BARTON. Do you know what percent of the cost of a coal-fired power plant is directed towards emission control?

Ms. MCCABE. I don't have that number with me.

Mr. BARTON. It is approximately $\frac{2}{3}$. Two-thirds of the cost of a new coal-fired power plant is for emission control, i.e. it is not for efficiency, it is not for power generation. It is simply to control emissions as a consequence of burning coal.

If we were to implement the proposed regulations, that would require carbon capture and sequestration, do you know what percentage of the total cost those emissions control would be?

Ms. MCCABE. I don't have that number. There—

Mr. BARTON. Would you agree with me that you are basically going to spend approximately three times the cost of the power plant itself to control the emissions, and capture and sequester the carbon?

Ms. MCCABE. I don't know that to be the case, Congressman.

Mr. BARTON. OK. Could you get us the numbers and provide—

Ms. MCCABE. Absolutely.

Mr. BARTON. I may be off, but I am not off orders of magnitude. I mean, I may be off a little bit, but if the country adopts these proposed regulations, if you want to build, you know, anybody that would be crazy enough to try to build a coal-fired power plant, you would basically be paying three to four times, for the emission control, what you are paying to generate the power.

Ms. MCCABE. What I can say, Congressman, is, based on the economic analysis that is laid out in our proposed rule, the cost of building a coal-fired power plant under the proposed standards is in line with other non-natural gas power generation. Biomass, nuclear, and such.

Mr. BARTON. Well, since they are non-competitive, that might be a true statement, yes. Finally, my time is expired, could you give the committee a summary of all CO₂ poisoning incidents in the last 5 years here in the United States? It is going to be a short piece of paper.

Ms. MCCABE. Yes. We are concerned about carbon because of its effects in the atmosphere and on the climate, which are well demonstrated.

Mr. BARTON. So you accept that nobody has been poisoned as a result of inhalation or exposure to CO₂ in the United States ever?

Ms. MCCABE. CO₂ does not work in that way, but it creates damage to public health without doubt.

Mr. BARTON. That is a debatable proposition.

Mr. WHITFIELD. Gentleman's time has expired. At this time I will recognize the gentleman from Kentucky, Mr. Yarmuth. Now, I think, at our last subcommittee hearing, we recognized that he was a new member of the Energy and Commerce Committee, and Mr. McNerney and I were talking, and he said, I don't think we introduced him, and I thought we did. But, Mr. McNerney, would you like to make some comments?

Mr. MCNERNEY. Well, no, I appreciate that opportunity. Mr. Yarmuth is a close friend of mine from Kentucky, so he is well connected to these issues. But, coming from a journalistic background, he has a lot of insight into how to proceed, and question witnesses,

so I really think he is going to be a tremendous addition to our committee and our subcommittee. Thank you.

Mr. WHITFIELD. Yes. And since Mr. Tonko actually was here before Mr. Yarmuth, you all now know Mr. Yarmuth, but we are going to recognize Mr. Tonko of New York for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. Sorry, Mr. Yarmuth. OK.

Administrator McCabe, welcome. The motivation for this legislation and the direction of the questions today suggest there is considerable skepticism about carbon capture and sequestration technologies. I strongly support moving forward to address carbon pollution, and I do not believe we can leave the utilities sector out of that effort. While I believe carbon capture technologies are technically feasible, I am not as confident about our ability to sequester the carbon dioxide, that is, capture. We may need to build new plants in areas that are not close to a storage reservoir. In light of that, I have a few questions.

Other than using the captured carbon dioxide for enhanced oil recovery, are there other options for sequestering carbon that are being considered?

Ms. MCCABE. Well, we know that it is possible to sequester carbon, even not for enhanced oil recovery. The EPA has regulations in effect now that provide guidance for people on how to do that, so it is doable.

Mr. TONKO. OK, thank you. And are there any opportunities being explored to use biomass as the final sequestration reservoir for carbon?

Ms. MCCABE. I don't know, Congressman, but we would happily follow up on that question.

Mr. TONKO. Thank you. Is there any opportunity for gaining further efficiencies in operation of a new coal-fired utility, or integrating renewable generation, or CHP, for that matter, with coal-fired generation that would enable a facility to meet the standard without having to capture and sequester all the carbon dioxide that is generated?

Ms. MCCABE. Well, I should clarify that the proposed rule does not require that all the carbon be captured. It is based on a partial carbon capture, about 30 to 50 percent, and this is all laid out in our proposal, is the point at which meaningful reductions of carbon can occur at a reasonable cost. There are other technologies and approaches that the power sector can use to reduce carbon, and you have named some of them.

Mr. TONKO. And that integration, you think, is feasible with other generation, or CHP?

Ms. MCCABE. I believe so.

Mr. TONKO. It seems to me we are focusing too much on what cannot be done, and not investing sufficient research dollars in solving the problems. Are we investing enough in research?

Ms. MCCABE. Hard for me to answer that, Congressman. I think that there is a lot of work being done to explore a variety of ways to produce power in a clean way. In addition, there are many companies that are on the forward edge of their industry, trying to find ways to reduce harmful pollution, including carbon. And there is government interest, and academic interest, in helping to further those technologies.

Mr. TONKO. Well, it is a trillion dollar industry, and a couple billions of research just may not cut it. I would also observe that we rarely have a technology ready to go to solve a problem if there is no certain market for that technology. Is it the administration's view that regulatory certainty will move technology development forward more rapidly?

Ms. MCCABE. That has been the history of the Clean Air Act, in developing standards for new plants of any sort, all sorts of industries, that putting those regulations in place provides a path for the industry, and those technologies then become standard.

Mr. TONKO. Well, I assume EPA is working closely with DOE on this effort. And, while DOE is not here today, I hope we will have an opportunity to hear from that agency on this topic also.

And, finally, I would ask, in terms of the instant legislation that we are reviewing here today, does that move us closer toward research at a time when we need that research? It seems to me it is pulling us away from research. It is not focusing on the element of that research.

Ms. MCCABE. Well, the bill, as I understand it, we are taking a different approach to determining how to set a standard for future power plants that would not provide the path for innovation, and moving new technologies into the market.

Mr. TONKO. Well, it seems we are in a phase of activity here where R&D is absolutely a compelling factor in order for us to transition, transform, an arena that is essential to the growth of this country, and its economy, so I thank you for your responses today, and it is great to have the agency represented here.

Ms. MCCABE. Thank you.

Mr. TONKO. I yield back, Mr. Chair.

Mr. WHITFIELD. Gentleman yields back. At this time recognize the gentleman from Nebraska, Mr. Terry for 5 minutes.

Mr. TERRY. Thank you, Mr. Chairman, and appreciate you being here.

I want to follow up on a white paper that was signed by 17 Attorney Generals, including ours from Nebraska. The white paper was sent to the EPA, as I said, by 17 Attorney Generals, and it states that, "The elimination of coal as a fuel for new electric generation would have highly concerning implications for electricity prices, and for the economy, and job creation in general, as well as the competitiveness of American manufacturing." I happen to agree with the Attorney Generals' statement on this, particularly in Nebraska, where we are a coal heavy reliant state, and very close to the Powder River Basin. So it allows us to have very affordable and reliable electricity generation in our state.

So I want to know, does the EPA maintain that it has legal authority to eliminate coal as a fuel for new electric generation?

Ms. MCCABE. The proposed rule would not eliminate coal for new electric generation. In fact, just the opposite. The proposal would provide a clear regulatory path that coal plants could follow.

Mr. TERRY. Now, I understand that answer, and some would say that the regulatory issues would, in essence, prevent, the way that they will be expected to be written and implemented would make it very difficult and expensive to use coal.

Now, the Attorney Generals also raise concerns that the EPA will not properly defer to the states in establishing or implementing standards for existing power plants, and that, under the guise of “flexibility”, the EPA will require existing plants to operate less, or shut down. Can you provide assurances to the Attorney Generals that in its GHG regulation of existing plants, EPA will not force the retirement or reduction of operation of still viable coal-fired plants?

Ms. McCABE. So, Congressman, now you are shifting to the existing—

Mr. TERRY. The new one—

Ms. McCABE [continuing]. Power plant—

Mr. TERRY. Yes, exactly.

Ms. McCABE [continuing]. Proposal, which, of course, is not at a proposal stage yet. It is at the very early stages of discussion. And the Clean Air Act provision for existing facilities operates in a very different way from the provision for setting new source performance standards. It does require the EPA to set guidelines, and then relies on the states to develop plans to achieve those guidelines in their states. This is the very successful and fundamental provision that underlies the Clean Air Act of the federal/state partnership when it comes to, especially, existing sources, that states are in the best position to figure out how best to comply with environmental targets.

So those are the discussions we are having now, and will be having. And the ultimate outcome, and what is expected of the existing fleet, will be very different from what is expected in a new source performance standard. And, as Administrator McCarthy has said, there is no expectation that carbon capture and sequestration would be a technology that would be appropriate for existing plants.

Mr. TERRY. OK. But, in discussions from some of our more rural coal-fired plant operations, they fear that the standards for reduction of CO₂, that will be extremely costly to meet, and, therefore, their only options, that is the quotations around flexibility, is to reduce their operations. Now, are you receiving feedback from states like Nebraska, where we do have older coal-fired plants that are going to be significantly impacted by this rule?

Ms. McCABE. We are having lots of discussions with states all around the country, including Nebraska and others, and we are discussing the differences between the new sources standard and the existing standards. And it is not our expectation that the existing standards, which, of course, will go through robust public comment period as well, will require the—

Mr. TERRY. So, for example, who would you be communicating with, or receiving input, at this early stage, from Nebraska? Is it from the power plants? Is it operators, the companies?

Ms. McCABE. Through our Region XVII office, there have been discussions both with state officials, and I believe also the power sector representatives, as well as other stakeholders.

Mr. TERRY. OK. Thank you.

Mr. WHITFIELD. Gentleman's time has expired. At this time recognize the gentlelady from California, Ms. Capps, for 5 minutes.

Mrs. CAPPS. Thank you, Mr. Chairman. And welcome, and thank you for your testimony, Administrator McCabe.

We have heard from my friends across the aisle, and from Senator Manchin, about the cost of implementing carbon emission standards, but we have not heard anything yet from them about the much higher costs that we are already paying for due to climate change. We are seeing more extreme storms, coastal erosion, and droughts across this country, not to mention the broader impacts of things like ocean acidification, and the increased public health risks. Ms. McCabe, will you elaborate a bit on this, please? What are some of the costs we are already paying for because of these unchecked emissions, and what are some that we will be paying for down the road if we don't take action now?

Ms. MCCABE. Thank you for your question. As you noted, there are significant impacts already being felt across the country, and indeed across the globe, as a result of the changing climate. You mentioned some of them. In this country we have seen increased wildfires, in both frequency and severity, that cost, in terms of property damage, in danger to human health, and indeed sometimes to human life. In addition, storms like Hurricane Sandy are tremendously costly, devastating to those communities——

Mrs. CAPPS. Yes.

Ms. MCCABE [continuing]. In terms of the property damage, the health impacts, which last far beyond the actual events——

Mrs. CAPPS. Absolutely.

Ms. MCCABE [continuing]. Of the storm.

Mrs. CAPPS. Thank you. I will move on, because——

Ms. MCCABE. Sure.

Mrs. CAPPS [continuing]. I know you could go on and on on that topic. Given that power plants are the number one source of carbon pollution, do you see any way to reduce these costs, the kind that you were talking about, without first reducing carbon emissions?

Ms. MCCABE. Carbon emissions need to be reduced.

Mrs. CAPPS. Yes. Now, we all know the cost and viability of carbon capture sequestration technology has been at the core of this debate. But, again, my friends across the aisle have been focusing on the cost, but at the same time ignoring the benefits of using this technology. Whether it is jobs developing better CCS systems, jobs installing the systems, or jobs in related industries that purchase the captured CO₂, which is a whole other industry, there are some benefits to CCS that should not be ignored, right? Now, Ms. McCabe, did EPA compare the costs and benefits of implementing CCS in its analysis? If so, can you briefly discuss those findings?

Ms. MCCABE. In our proposal we have an economic analysis that lays out all these issues, and looks at the expected costs of the technologies for gas and coal plants, so all that information is laid out.

Mrs. CAPPS. Thank you. And that is something that is available to the public——

Ms. MCCABE. Absolutely.

Mrs. CAPPS [continuing]. So that we can see that there is a pay-off in economic development for doing this.

And a final question. We hear frequently that power companies would be eagerly building new coal plants, if only it weren't for the

uncertainty created by EPA and these carbon emission regulations. Setting aside the fact that cheap natural gas has really been the primary reason behind the recent decline in coal, which I did hear mentioned in this hearing, I do want to focus on this uncertainty issue. To me, if there is one thing for certain in this debate, it is that carbon emissions must, and will be, regulated, it is just a matter of how and when. I mean, we regulate everything in energy generation, don't we?

EPA's authority to regulate carbon emissions from power plants has been upheld twice by the United States Supreme Court, and President Obama has made it very clear that these power plant rules are a top priority for his administration. I see this discussion draft, and other efforts to derail the emission standards, as simply delaying the inevitable. So I want to ask if you think this proposed legislation would decrease or increase uncertainty regarding the regulation of carbon emissions. Industry tells me all the time that what they want is certainty. So I would like to have your comments on this.

Ms. MCCABE. I hear that also, Congresswoman. I have heard that over the years from industry, that they want regulatory certainty so that they can plan their investments, and know what they should be building. And this proposal that we are going forward with would provide that, as opposed to a delay and further—

Mrs. CAPPS. Right.

Ms. MCCABE [continuing]. Uncertainty.

Mrs. CAPPS. And don't you feel that the industries do recognize that they will be facing, if not sooner, later, some more regulation as they develop newer and newer technologies?

Ms. MCCABE. That is what we have heard from many industries.

Mrs. CAPPS. Thank you very much for your testimony.

Mr. WHITFIELD. Gentlelady's time has expired. At this time recognize the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Thank you, Mr. Chairman, and thank you, Administrator, for being with us today. Really appreciate your testimony today. And, just to give you a little background about my neck of the woods, Ohio gets 78 percent of its overall electricity comes from coal-fired plants. And up in my area of Northwest Ohio it is even greater than that. According to the national manufacturers, I have 60,000 manufacturing jobs in my district, which is the third largest number of manufacturing jobs on this committee. I also represent the largest number of farmers, so what it really comes down to that you are hearing is that we need energy, and we need very competitive energy to be able to compete. And we are able to compete out there as long as we can have those things happening. But if all of a sudden our energy costs start going up we are in trouble.

And also I am blessed because, not only do I have your traditional large energy companies that are in my state, and across my district, but I also have electric co-ops, which I also have the largest number in the State of Ohio in a congressional district, and I also represent a large number of municipal utilities. And I also go through a lot of businesses, and I have gone through over 400-plus businesses over about a 14-month period. And the number one thing I have always heard from everybody out there, it is on regu-

latory issues is the number one concern, but it is also about the EPA. And when we are talking about the EPA, I have never heard any business out there ever tell me that they are not for clean air, or for clean water. But they are very concerned, because one of the issues, again, that concerns them is that they have got to be able to be competitive.

And when I look at the proposed bill, especially in section three, one of the issues that it comes down to, what you would be looking at, they have to study the economic impacts of such rural guidelines that affect the potential economic growth, competitiveness, and jobs on the electric ratepayers out there. So, again, that is what concerns the people in my district, and, really on the manufacturing side. And if I could just ask a few questions, real quickly?

The first is when you are talking about the EPA conducting listening sessions, willing to plan regulations for existing power plants, the EPA has really avoided states like Ohio that, again, rely heavily on coal-fired generation. Can the EPA provide any assurance that it will defer to states to set the standards of performance for existing electric generating units in their states?

Ms. MCCABE. What I can tell you, Congressman, is that the way that this section of the Clean Air Act works is that EPA establishes guidelines, and then the states develop plans to implement them. And that is a familiar approach in the Clean Air Act. Very much our intent is to work with states so that they have the flexibility to do that. And that is what a lot of these initial interactions we are having with the states are all about, is to make sure that we know what is going on currently in the states, what they are looking forward to in their own energy policy, so that we can make sure that we design a guideline that can accommodate that kind of flexibility.

Mr. LATTA. Well, it is very, very important that that happens, because, again, if you don't hear what is happening in these businesses out there, we are not going to have those folks out there that are going to be able to provide these jobs. And also, can the EPA provide the assurance for the ratepayers in these states that the electricity rates will not go up as a result of the EPA regulations?

Ms. MCCABE. We have seen over time that pollution control technology has been able to advance in this country in the power sector while keeping energy costs low, and that is a very important consideration for the administration as we move—

Mr. LATTA. Well, and again, because I am out talking to these businesses every week, and again, their number one issue is we have got to stay competitive. We don't want to see these jobs going someplace else, because they want to make sure that they have jobs for their community.

And also, again, because when you look how unique, like Ohio is, in the Midwest, and Indiana right next door, and I represent a district that runs right down the Indiana line. When you look how much energy they get from coal in Indiana, will the EPA thoroughly look at the regional and local electricity rate impacts on these regulations?

Ms. MCCABE. We will look at those sorts of things, and we recognize that different states are in different positions. They have dif-

ferent energy mixes, different fuels, different energy needs. And all of that can be looked at in the development of a state specific plan.

Mr. LATTA. And finally, some of the discussion was occurring, especially with Mr. Barton earlier. Could you provide the committee with a list of the facilities that were using scrubbers when the standard was implemented and made final in the late 1970s on the—

Ms. MCCABE. Sure.

Mr. LATTA [continuing]. Clean Air—we get a list of those companies, we would appreciate that.

Ms. MCCABE. We will follow up with that.

Mr. LATTA. OK. Thank you very much. Mr. Chairman, see my time has expired, and I yield back.

Mr. WHITFIELD. Gentleman yields back. At this time I will recognize the gentleman from Kentucky, Mr. Yarmuth, for 5 minutes.

Mr. YARMUTH. I thank you, Mr. Chairman. I appreciate the welcome, again, and thank you, Mr. McNerney, for your kind comments. Ms. McCabe, welcome.

There was discussion earlier about whether Congress intended originally in the Clean Air Act to regulate carbon emissions, and the comment made that a court basically ruled that it did. Regardless of how we came to this point, the state of the law is that not only does EPA have the authority to regulate carbon emissions, it has the requirement to regulate carbon emissions, isn't that correct?

Ms. MCCABE. That is correct.

Mr. YARMUTH. And this bill, if I am correct, does not change that requirement in any way. I mean, even if this bill were to pass, you still have to regulate carbon emissions?

Ms. MCCABE. As I understand it.

Mr. YARMUTH. So what this bill basically does is just eliminate one of the tools that you might have to regulate carbon emissions to meet the requirement that you have under the law?

Ms. MCCABE. It would significantly change the traditional approach that we have taken—

Mr. YARMUTH. Right.

Ms. MCCABE [continuing]. Under the Act.

Mr. YARMUTH. And we know there was another approach to doing this, and Mr. Waxman mentioned it in his testimony. And I want to go back to 2009 for a minute, because, when we were debating Waxman-Markey at that time, this was a very hard issue for me and the other members for the delegation from Kentucky. So we, at least we Democrats, then Ben Chandler and I, and Baron Hill from Indiana, and others, worked with Representative Boucher of Virginia to kind of construct a methodology that would have minimal impact, or the least negative impact on Kentucky, which generates about 92 percent of its power through coal, and same in my district in Louisville.

And after we had done that work, and came up with a final product, before I cast my vote, I talked to all of the big users of energy in my district. I talked to General Electric, which has a big manufacturing plant, Ford Motor, which has two plants. I talked to UPS, where we have the air hub. I talked to the metro government. I talked to University of Louisville, the public school system. Every

one of those large users of energy said they were either for or neutral on the bill. They didn't think any of them, none of them, that it would impact them negatively. And then I talked to the utility company, which powers virtually everybody in my district, and they said they thought the impact on residential customers after 10 years would be \$15 a month additional cost if they did absolutely nothing. Didn't insulate, didn't change light bulbs, didn't make any changes on the thermostat.

So, at that point, we were faced with the option of saying, all right, this looks like it can work. It can actually deal with carbon emissions in a way that doesn't impact states that are heavily dependent on coal generated power. The option is to turn it back to EPA to issue guidelines which may or may not be particularly sensitive to a state like Kentucky, or a state like Indiana, or a state like Ohio. And I thought that was a good vote. And even though House Republicans opposed it, we did pass it in the House. It died in the Senate.

So my question is, would that kind of methodology still be an effective way to deal with carbon emissions, and if we had enacted Waxman-Markey in 2009, would we be here today?

Ms. MCCABE. Well, the President has indicated, over a number of years, that legislation would be an appropriate way to deal with the situation. But that is not where we are today, and so we are using the tried and true mechanisms of the Clean Air Act to achieve the carbon reductions that are necessary.

Mr. YARMUTH. All right. And, to your knowledge, has there been any proposal made by anybody in the majority party to deal with carbon emissions in any way?

Ms. MCCABE. I don't want to speak for everybody, but I am not aware of any.

Mr. YARMUTH. Right. Well, thank you very much for your testimony and your work. I yield back, Mr. Chairman.

Mr. WHITFIELD. Gentleman yields back. At this time recognize the gentleman from Texas, Mr. Olson, for 5—

Mr. OLSON. I thank the Chair. Again, welcome, Administrator McCabe.

This is not news, but America is on course to resume its role as the world's energy powerhouse in the 21st century. There is no better example of that than the port of Corpus Christi in my home state. A few months ago, for the first time ever, they exported more oil than they imported. Making this opportunity a reality requires common sense rules and no overregulation. Your new power plant rule will require carbon capture and sequestration. The CCS pilot projects are all near oil country. Captured carbon is sold, captured, pumped down, and used to jump start old wells. EOR is critical to viable CCS, and you recognize that. A quote from your new plant rules impact analysis, "The opportunity to sell the captured CO₂ for EOR, rather than paying directly for its long term storage, strongly improves the overall economics." So let us discuss EOR.

Coal is critical for power supply in the Eastern part of our country. Do you know how many states east of the Mississippi have a single CO₂ pipeline? Any idea what number?

Ms. MCCABE. No, I don't know.

Mr. OLSON. The answer is two. There is one in Mississippi, and a small one on the Michigan/Canadian border. The one in Mississippi is linked to the Hastings field in my district. It is run by a company called Denbury. I visited their operations a few months ago. They spent \$2 billion on developments for the Hastings field. But they also own the Jackson Dome area in Mississippi, which naturally produces CO₂. There is a power plant in my district as well that captures CO₂ emissions from coal-fired power plants, and uses them for EOR operations right there, over an existing oil field.

Ms. MCCABE. Yes.

Mr. OLSON. My point is that CCS EOR will only work because of geography and luck. My question is, if a utility decides to build a coal plant, they want, to use a quote from your impact analysis, "to strongly improve the overall economics of CCS. That means they will need a new pipeline." Is it reasonable to expect utilities to successfully site, permit, finance, and build an entire new network of CO₂ pipelines? Is that even possible for more than a few test plants?

Ms. MCCABE. Well, as you have noted, EOR is a very important use of captured CO₂, does help with the economics of a plant, but that is not to say that carbon storage is not feasible in other places, and we expect those types of projects to develop and be viable as coal plants of the future are built.

Mr. OLSON. But right now they are not viable without EOR, and that is my point. We have to have some mechanism to get this carbon dioxide to these power plants. Except for special circumstances, geography, with the guise of the Denbury people owning a naturally producing CO₂ structure.

My final question is about reliability. And EPA says that the new plant rule won't impact electric liability. However, the EPA says one benefit is that, and this is a quote, "the proposed rule will also serve as a necessary predicate for the regulation of existing sources." We don't know exactly what the new existing plant rule will look like, but if past actions of the Obama administration reflect the future, there will be new burdens put upon coal. My home state is in desperate need of more power, and reliability is one of my top concerns. Can you guarantee that a carbon dioxide rule on existing coal plants will put grid reliability first?

Ms. MCCABE. You are asking about the existing rule?

Mr. OLSON. The existing rule, any rule.

Ms. MCCABE. For existing power plants?

Mr. OLSON. Yes, ma'am.

Ms. MCCABE. Yes. I can assure you, Congressman, that in looking at what the guidelines would be for existing power plants, we would have grid reliability, cost, and those considerations very much in our minds as we go forward. And as I have noted, the implementation of those guidelines is something that the states will be involved with, and it will be very much on their minds as well.

Mr. OLSON. But first, number one, everything else below? I mean, because it is important, ma'am. We have to have power to keep going.

Ms. MCCABE. It is absolutely important, and we don't disagree.

Mr. OLSON. OK. Yield back the balance of my time.

Mr. WHITFIELD. Gentleman's time has expired. At this time I recognize the gentleman from Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you, Mr. Chairman. I would have to say that many of the things my colleagues have said I agree with, and I do have many concerns, particularly in light of the fact that I did hear earlier from the folks who run the Mississippi plant that that is not a practical plan anywhere else, and it cost them a billion dollars more than they thought it was, and only works because they are right next to the fuel source, which is not your typical coal in the United States.

Switching gears, as established in statute and practice, the term stationary source has a specific meaning under Section 111 of the Clean Air Act. Is the EPA considering or planning to redefine what stationary source means for the purposes of its pending rulemaking activity on existing electric generating units? And here is my concern. There are some who would believe, or have us think, that it ought to be the whole state. So if I have got a plant, which we do, that was just opened last year in my end of Virginia, and it is doing fine, but the rest of the state isn't, instead of looking at each individual plant, that the EPA may be looking at changing its rule, and going with every state, and then all of a sudden new regs get put on my clean plant in order to try to help the plants that aren't as clean in other parts of the state. Is the EPA looking at changing any of those rules in regard to the stationary source?

Ms. MCCABE. We are not looking at changing the definition of stationary source, but what we will be doing, through the 111(d), which is the existing source—

Mr. GRIFFITH. Yes.

Ms. MCCABE [continuing]. Program, is allowing the states the flexibility to look at how to meet a target, looking across all of the plants, and other activities in the state, which means that new clean plants are a benefit to the states, because they are already making progress towards reducing carbon emissions.

Mr. GRIFFITH. But if you have some plants that are cleaner than others, and the worry that I have is that oftentimes in the past the EPA has said, well, we are going to let the state do this, and then the EPA, behind the scenes, and this happened on storm water management in Virginia, says, you are going to adopt these regs, you are going to do this, or else we are going to come in and take it away from you, and we are going to do it ourselves. That was actual testimony in front of a committee I used to sit on when I was in the state legislature.

So I am a little concerned that if you are going to let the states go and look at a statewide project, maybe it is not my new clean plant, but it is one that is a little bit newer than some of the others. Is there going to be pressure put on the states to then say, OK, we don't care if you have one bad actor, or two bad actors, you have got to ratchet it up on everybody in order to meet certain standards.

Ms. MCCABE. Yes. Well, in the Clean Air Act, which is what I am familiar with, we have a long history of working with states, developing plans to implement the federal standards, and there is certainly room in the process for states to be looking at what makes the most sense for their states.

Mr. GRIFFITH. Well, and I would like to think that we could figure out what makes the most sense, but that has not been my experience in the past with some of the regulations. In context of 111(d), and regulations for existing power plants, the EPA frequently refers to the term flexibility. I have not often found that to be the case. And not with you, ma'am, but with others. Does this mean flexibility in setting the standards, or in implementing the standards?

Ms. MCCABE. In implementing the standards. It is EPA's role to set the guideline, the target.

Mr. GRIFFITH. But if flexibility is good, shouldn't it be good not only for implementing, but also for setting the standards, to make sure that we are not putting people out of business, or, as you testified a few minutes ago, making sure that we have grid reliability? Shouldn't that flexibility be there on both ends of that equation?

Ms. MCCABE. Well, the Clean Air Act's approach over the last 40 years has been for the Federal Government to set the expected environmental result, and then for the states to find flexible and appropriate ways to meet those, and that is the way that Congress set out those provisions.

Mr. GRIFFITH. And Congress did give, I would think, way too much flexibility to the EPA, but that is an opinion of mine.

In regard to the Whitfield-Manchin bill, it seems to me that it is reasonable to set standards based on actual demonstrable technology. You would agree with that, would you not?

Ms. MCCABE. The Clean Air Act already asks us to set standards based on—

Mr. GRIFFITH. I am running out of time. I need a yes or no. But you would agree that actual technology, as opposed to theorized technology, would be preferable, would you not? Yes or no?

Ms. MCCABE. Actual technology is what we base our rules on.

Mr. GRIFFITH. All right. And would you also agree with me that there are high efficiency designs for new coal power plants, such as the super-critical and ultra-critical steam units, yes or no?

Ms. MCCABE. Yes, and those are appropriate technologies, certainly.

Mr. GRIFFITH. And the Whitfield-Manchin draft legislation simply requires that, for new electric generating units, the EPA standards would be based on technologies that have been demonstrated at operating commercial power plants, and that is certainly reasonable, isn't it?

Ms. MCCABE. That would not—

Mr. GRIFFITH. I am out of time.

Ms. MCCABE [continuing]. Be the approach of the Clean Air Act, that has been proven over the years to work effectively in developing—

Mr. GRIFFITH. So is that a yes or a no?

Ms. MCCABE [continuing]. New technology. I would not agree.

Mr. GRIFFITH. All right.

Mr. WHITFIELD. Gentleman's time has expired. At this time I recognize the gentleman from West Virginia, Mr. McKinley, for 5—

Mr. MCKINLEY. Thank you, Mr. Chairman. I have got five questions at least, if not more, but we will try to see if we get through some quickly with it. The first is, I am just curious, some of the

earlier statements had been about that this is commercially viable now.

Ms. McCABE. Yes.

Mr. MCKINLEY. Because I am curious, Lisa Jackson said, back in November of 2011, that it wouldn't be available for, and her quote was "maybe a decade or more." So I am curious how that has moved up on the chain. And DOE put out their own report that said it is not going to be commercially viable until 2020 as well. But you are saying it is available now. So could you get back to me explaining why you disagree with Lisa Jackson, and why you disagree with the Department of Energy, their projection that it could be available? Could you get back in writing to me, rather than answer now?

Ms. McCABE. Certainly.

Mr. MCKINLEY. Thank you. Second is, I want to probe a little further about you saying how coal-fired powerhouse will be viable. You have answered that, but, as an engineer, I want to probe a little deeper with that. When you say viable, do you mean that will maintain that 38 to 40 percent of the portfolio of this country of energy production?

Ms. McCABE. We expect coal to remain a substantial portion of the energy portfolio—

Mr. MCKINLEY. No, I asked—

Ms. McCABE [continuing]. Even under these—

Mr. MCKINLEY. No, the question I asked was—

Ms. McCABE [continuing]. Even under the proposed—

Mr. MCKINLEY [continuing]. Thirty-eight to 40 percent?

Ms. McCABE. That is a pretty precise number.

Mr. MCKINLEY. OK, call it 35 to 40 percent, then, where it is now. Is coal going to lose more under these regulations? OK, you are the one that used the term viable. I am trying to define viability. I would say viability is 7½ cents per kilowatt hour in West Virginia. Are you saying that the price of electricity is going to go up?

Ms. McCABE. Congressman, there are a number of factors that are affecting the power sector now—

Mr. MCKINLEY. Will the price of electricity go up under your definition of viability?

Ms. McCABE. I can't give you a—

Mr. MCKINLEY. And you can't define whether or not it is going to be the 35 to 40 percent?

Ms. McCABE. Well, there are a number of factors that go into how much of the power in this country—

Mr. MCKINLEY. So we could—

Ms. McCABE [continuing]. Is produced by—

Mr. MCKINLEY [continuing]. Your term of viable, we could have less and less use of coal. I am just concerned about all the coal miners, and the people that work in these mines, or the people in the industry, how they are going to find jobs, if it is less and less, and you are saying it is viable. I am not so sure I am into that.

Let me go to a third element very quickly with it. The United Nations panel came out with a report. They have been doing it periodically. They talk about that 96 percent of all CO₂ emissions are

naturally occurring, and what this whole fight is all about is just four percent. Do you agree that it is just four percent?

Ms. McCABE. I don't agree—

Mr. McKINLEY. Four percent I am saying is anthropogenic.

Ms. McCABE. I don't agree that anthropogenic emissions are not a significant factor in—

Mr. McKINLEY. That is not the question. State the question, please. Do you agree with the United Nations, that said four percent of all CO₂ emissions come from man?

Ms. McCABE. I am not familiar with that statement, Congressman.

Mr. McKINLEY. OK. But you will accept that under the, well, maybe you don't, if you are not familiar with it, but I think it was the Sierra Club, maybe Earth Justice. I know that Al Gore has said that 30 percent of all man-made CO₂ emissions come from the deforestation of our tropical rain forests, so that would represent 1.2 percent. If it is four percent, 1.2 percent would be 30 percent of four. But yet coal-fired powerhouses only generate, what, do you know the number?

Ms. McCABE. They—

Mr. McKINLEY. Two tenths of one percent of the CO₂ emissions in the world come from American coal-fired powerhouses, six times less than the deforestation of our tropical rainforests. But yet, with all these regulations you are putting at risk all the American workers in these powerhouses, and coal mines, and all across this country. Two tenths of one percent, you are willing to put our economy at risk for $\frac{2}{10}$ of one percent. I am not comfortable with that.

Mr. McCABE. Coal fired power plants are the largest sources of carbon in the country.

Mr. McKINLEY. It is $\frac{2}{10}$ of one percent of the global emission, six times worse in the deforestation of our tropical rainforests. So my question is, if we decarbonize America, that is what you are trying to do, who are you going to blame the next time there is a snowstorm, or there is another tornado? Because we won't be producing CO₂ in America any longer, so who is the EPA going to blame next?

Ms. McCABE. There are many steps that need to be taken to reduce carbon, and if—

Mr. McKINLEY. Who will you blame next? If we don't produce CO₂, what will be your excuse for the next tornado, the next Hurricane Sandy? I am sorry, my time has run out.

Mr. WHITFIELD. Gentleman's time has expired. At this time, recognize the gentleman from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman, and I would like to thank our witness for being here. And the topics we are addressing today at this hearing are complicated, and there are a wide range of views. I believe it when scientists tell us that man-made global warming is real, personally, I believe to successfully regulate GHG emissions, Congress should develop a regulatory program that would promote economic growth, and provide the responsible path forward. But until Congress moves to pass meaningful legislation, efforts such as this legislation are not the correct way to address that issue.

Ms. McCabe, coming from Texas, in the Houston area, I have been interested, and I know we had Secretary Moniz here a while

back. I know that Secretary Moniz visited the plant in Mississippi this week and endorsed the technology. At this point, where are we with that CCS technology?

Ms. MCCABE. Yes, the Secretary was there and visited the plant. The technology at that plant, and several others, is moving forward, so we are looking forward to those projects beginning operation, and others considering it.

Mr. GREEN. OK. My next question would be is CCS technologically and economically feasible for everyone? Because I know there have been some problems at the Mississippi plant.

Ms. MCCABE. Well, the Mississippi plant has a variety of other activities going on beyond the CCS. But the technology is available to plants widely.

Mr. GREEN. And we know from other EPA studies and proposals there is always concern about accurate data. Is the EPA 2012 proposal data still accurate enough to be effective?

Ms. MCCABE. Well, we always try to base our rules on the most accurate data, and the transparent and open rulemaking process make sure that people have an opportunity to give us the most up to date data. So, before we would finalize any rule, we would make sure we had the most up to date data.

Mr. GREEN. Well, and again, coming from Texas, I know our state agencies are unique, and have important information to assist them in balancing these economic demands. Keeping that in mind, how would you characterize the states' regulatory efforts up to this point, and their importance moving forward?

Ms. MCCABE. Well, the states are key regulatory partners in reducing pollution in this country, and always have been, but the system that we have relies on national standards being set for major industries across the country, so that the pathway is clear so that power plants built all across the country that are of similar types would meet the same standards, and then the states very effectively implement those rules.

Mr. GREEN. I guess I am still skeptical about the economic feasibility of that. And again, I am looking forward to what happens in Mississippi, because I represent a refining community, and we do have storage places in Texas that you can store the carbon.

But the President recently announced an end to the financing of overseas coal plants in emerging markets. This, combined with the EPA actions, are significant measures. And again, we know what China is doing on coal, and I am sure we are not providing any overseas financing for that, but in other areas. Is the administration action enough to really address climate change without strong mandatory reductions by other major emitters, including, like, China and India?

Ms. MCCABE. Well, this is a global challenge, as you have indicated, and actions will need to be taken by many people. Part of the President's climate plan is strong United States leadership internationally. And one important aspect of being a credible and strong leader internationally is to be doing the things we need to do here at home. So the plan includes very much both of those elements.

Mr. GREEN. I know the United States has reduced our carbon emissions over the last few years for lots of reasons. You know,

downturn in the economy, more fuel efficient vehicles. But we have actually reduced our country, but in Western Europe, and, of course, in the emerging nations, in the developing nations, there has been hardly any. In fact, it just continues to grow. And I hear my colleagues from West Virginia are concerned. We can do everything we want to in this country on carbon, but unless our international partners and competitors are on the same wavelength, it doesn't do us any good, except maybe price our economy out of the world market, and that is, I think, a lot of our concern. But I appreciate you being here.

Thank you, Mr. Chairman. I yield back.

Mr. WHITFIELD. Gentleman yields back. At this time recognize the gentleman from Louisiana, Dr. Cassidy, for 5 minutes.

Mr. CASSIDY. Thank you, Mr. Chairman.

Ms. McCabe, I am over here. Let me build a little bit on the questions that Mr. Green just asked. Earlier this year I introduced the Energy Consumers Relief Act to provide greater relief and transparency about the costs and jobs impact of EPA regulations that cost at least a billion dollars. Now, first, let us just, if you will, kind of establish common ground. Do you agree that EPA rules can affect the economy by raising electricity rates for consumers, and business, and et cetera?

Ms. MCCABE. I agree that it is an important issue to look at, and a lot of information needs to be evaluated by experts.

Mr. CASSIDY. Now, one of the wonderful things we are hearing about right now is re-shoring, where companies are bringing jobs back from places like China and India because our cost of electricity is so much less than theirs. We can't beat them on the price of labor, we are whacking them on the price of electricity. So again, building on what Mr. Green said, is it a concern at EPA that these regulations will effectively increase the cost of that electricity to the point that we will not have the same amount of re-shoring, the same number of jobs being created in these energy intensive enterprises?

Ms. MCCABE. We do enjoy very low energy prices in this country, and that has been the case throughout the history of the Clean Air Act, and improved efficiency, and lowered emissions from power plants. So we have been able to maintain those low prices.

Mr. CASSIDY. Now, that is certainly retrospectively, but if we speak going forward, and a lot of rules are put in which effectively prejudice against coal, which is now, what, 40 something percent of our energy supply, do we have the risk of undoing that? That, as we raise the cost of electricity, what was true in the past will not be true in the future, because of these regulations, serving as a form of attacks, raising the cost of electricity, adversely affect the movement of jobs back from overseas?

Ms. MCCABE. The analysis that we do for this rule will be the kind of analysis that we have done for previous rules. And I expect that this rule will work in a similar fashion. That is—

Mr. CASSIDY. Now, I have some concern, which is why I put forward that law, if you will, about encouraging transparency. Again, do you accept that there should be transparency about the potential cost of EPA regulations to ratepayers?

Ms. MCCABE. EPA follows robust transparency and public input processes for all of our rulemakings.

Mr. CASSIDY. Now, you say that, but during an EPA budget hearing this past spring, the EPA's Acting Administrator admitted that EPA had not done sufficient economy-wide modeling to account for the full economic impacts of its major rules, including higher rates paid by electricity consumers as a result of regulations.

So let me ask, will you commit that, for any regulations relating to existing power plants, including the pending greenhouse rules, that EPA will conduct economy-wide modeling to measure the cost of the higher electricity rates on households, businesses, and its effect upon the re-shoring that we need to happen in order to recreate good jobs with good benefits for the working class of America?

Ms. MCCABE. In all of our economic analysis that we do for our rules, EPA follows OMB procedures, and uses appropriate peer reviewed and transparent analysis and approaches.

Mr. CASSIDY. But I am trying to reconcile that with the Acting Administrator admitting they had not done sufficient economy-wide modeling to account for the economic impacts of major rules. So there seems to be a little bit of discordance. You are saying that you have, and yet he is saying that they had not.

Ms. MCCABE. No, there is no disagreement there. Economy-wide modeling is an approach that has not been used in our rules because there are not appropriate analytical methods to do it.

Mr. CASSIDY. Now, on the other hand, I am almost out of time, but if you don't do that, then that gets back to where I was going with this. If you don't do the economy-wide, we don't understand the ripple effect, smushing, if you will, the hope for re-shoring of jobs.

Ms. MCCABE. The agency has engaged with our Science Advisory Board to undertake right now an inquiry into the types of appropriate models that would be used.

Mr. CASSIDY. So my fear is that if you don't come to a conclusion before these regulations are put out, the hope for re-shoring of those jobs will not happen. Your regulations are creating uncertainty. Business hates uncertainty. They are not going to come back if, my gosh, all of a sudden our electricity rates are going up, will they?

Ms. MCCABE. The regulations are creating certainty, so that plants will know——

Mr. CASSIDY. But it may be certainty of higher cost. You have not done your economy-wide modeling, and so, therefore, you don't know whether or not the energy intensive enterprise will suddenly find themselves priced out both on labor and on the cost of energy, correct?

Ms. MCCABE. There has been an economic analysis done on the proposed rule. It is open for comment, and——

Mr. CASSIDY. But not economy-wide, you point out.

Ms. MCCABE. Because the methodologies for that approach are——

Mr. CASSIDY. So, therefore, we don't know, and so, therefore, we may be keeping jobs from re-shoring because you don't know, because we don't have the model. That is my fear.

I am out of time. I yield back.

Mr. WHITFIELD. Gentleman's time. At this time I recognize the gentleman from Colorado, Mr. Gardner, for 5—

Mr. GARDNER. Thank you, Mr. Chairman, and thank you, Ms. McCabe, for your time here today and your testimony.

You just mentioned that, and I wanted to follow up with Mr. Cassidy, that your regulations create certainty. You just said that. Does your regulation make electricity more or less affordable?

Ms. MCCABE. Our regulation, as required by 111(b) of the Clean Air Act, is intended to require for future power plants state of the art technologies—

Mr. GARDNER. Well—

Ms. MCCABE [continuing]. That will—

Mr. GARDNER. If you don't mind, I have a series of these questions. Does it make electricity more or less affordable?

Ms. MCCABE. The rules that we will be requiring will allow coal plants to proceed in a way that is—

Mr. GARDNER. Right, but I am trying to get to the certainty that you said your regulation creates.

Ms. MCCABE. Yes.

Mr. GARDNER. If this regulation creates certainty—

Ms. MCCABE. Yes.

Mr. GARDNER [continuing]. Does your regulation make electricity more or less affordable?

Ms. MCCABE. We do not expect that these rules will make electricity less affordable in this country—

Mr. GARDNER. OK.

Ms. MCCABE [continuing]. As plants are able to plan ahead and build plants that will meet the requirements—

Mr. GARDNER. So will it make electricity more or less expensive, then? Maybe that is a better way to put it.

Ms. MCCABE. These are the kinds of things that we look at in our economic analysis, and—

Mr. GARDNER. Right. So—

Ms. MCCABE [continuing]. Everybody can—

Mr. GARDNER [continuing]. To keep that certainty, and to keep the certainty that you said these rules provide, does it make electricity more or less expensive?

Ms. MCCABE. The analysis may show that the addition of additional equipment will increase costs to—

Mr. GARDNER. OK, so there is the certainty right there. So it will increase electricity costs, thank you. You said that you did economic viability projections analysis. Were you at the coal hearing in Denver that the EPA held, the listening session in Denver?

Ms. MCCABE. No, I wasn't.

Mr. GARDNER. OK. So do you do economic viable studies of communities where they produce coal?

Ms. MCCABE. We do economic analysis of the proposed rules that we are looking at.

Mr. GARDNER. But, do you look at the communities, where there is a coal mine, and there are employees there? I mean, do you look at the economic viability of those communities, and what happens in this rule that you are certain will make electricity more expensive?

Ms. MCCABE. I should amend what I said a minute ago, or clarify what I said a minute ago. The analysis that we have put forward on this rule does show that this particular rule will not increase electricity prices.

Mr. GARDNER. OK. Do you believe that overall regulations at EPA increase the cost of electricity?

Ms. MCCABE. I—

Mr. GARDNER. Looking at this regulation in combination with other regulations that have come through on greenhouse gases, or electricity production from coal?

Ms. MCCABE. There are many factors that affect electricity prices over time, and environmental regulations have been shown to be a very, very small aspect of what increases prices.

Mr. GARDNER. Do you think those price increases have a larger impact on people who may be on a fixed income?

Ms. MCCABE. The price of electricity overall is something that affects people. But, as I said, the contribution of environmental regulation to those cost changes is minimal.

Mr. GARDNER. All right. Just a couple of other questions. For existing plants, do you agree that states will have a primary role in setting performance standards for electric generating units?

Ms. MCCABE. For existing plants, the role that states have is to design the plan at the state level that will meet the guidelines that the EPA will establish.

Mr. GARDNER. So the states will have a primary role under the Regional Haze Program, this is what I am getting at, which is also a program intended to be implemented primarily by the states, EPA has been routinely disapproving SIP plans, and seeking to impose federal implementation plans that require plant owners to spend millions of dollars, or shut down their units. Where states object, or challenge the EPA, EPA then proceeds to enforce these federal implementation plans through litigation. We have got examples of these in Arizona, New Mexico, Montana, North Dakota, Utah, and Wyoming. Will you provide me with an assurance the EPA will give states more deference under its pending greenhouse gas regulations than the agency has done under the Regional Haze Program?

Ms. MCCABE. EPA, in fact, has approved the majority of the Regional Haze plans.

Mr. GARDNER. So, again, the question is will you give states more deference under its pending greenhouse gas regulations than the agency has under its Regional Haze Program?

Ms. MCCABE. EPA will work with the states, as we always do, when they have the authority to design state plans, to make sure that those state plans meet the federal target.

Mr. GARDNER. And I have some additional questions. When we had Administrator McCarthy before the committee last year, we talked about new source performance standards for power plants, and, in our exchange, she testified that she could not rule out regulation of any of the 70 source categories under EPA's new source performance standards program, which covered all types of industrial activities. Is that still your position, that you cannot rule any source out?

Ms. MCCABE. We are focused on the actions laid out in the President's Climate Action Plan, which has power plants as the rule-making that we are——

Mr. GARDNER. Yes. Are there any source categories the EPA can affirmatively rule out of greenhouse gas regulations?

Ms. MCCABE. There are many source categories that EPA regulates that we have——

Mr. GARDNER. So you can't rule——

Ms. MCCABE [continuing]. No——

Mr. GARDNER [continuing]. Any of them out?

Ms. MCCABE [continuing]. Present intention of——

Mr. GARDNER. If the EPA doesn't pursue regulation of all these emission sources, can the EPA guarantee that there will not be lawsuits to compel the regulation?

Ms. MCCABE. I can't guarantee that there won't be lawsuits. The EPA gets sued all the time. But we make our decisions about what to do based on the science, and priority setting, and power plants are clearly the largest source of carbon in the country.

Mr. GARDNER. The Chairman has been incredibly indulgent of my time. And just, finally, one last question. Can the EPA provide an assurance that there won't be an ever expanding suite of EPA greenhouse gas regulations?

Ms. MCCABE. As I said, we are focused on the source category that contributes the most carbon pollution in this country.

Mr. GARDNER. So there could continue to be an ever expanding suite?

Ms. MCCABE. There are a number of source categories that I would not expect us to be looking at, in terms of greenhouse gas emissions, and we are focused——

Mr. GARDNER. Be interested in finding out what those are. Thank you.

Mr. WHITFIELD. Gentleman's time has expired. At this time I recognize the gentleman from Texas, Mr. Hall, for 5 minutes.

Mr. HALL. Thank you, Mr. Chairman.

Ms. McCabe, the Bureau of Labor Statistics reported, back earlier in November 2013, that there were 11.3 million Americans unemployed, including 4.1 million long term unemployed, and they also reported 8.1 million underemployed individuals, those working part time, or had been cut back on the work, or couldn't find a full time job. Would you agree that raising energy prices when we are facing such chronic levels of unemployment is not in the best interest of the economy?

Ms. MCCABE. Congressman, we are very concerned, as you are, about jobs in this country, and about——

Mr. HALL. I know you are——

Ms. MCCABE [continuing]. The economy of this country——

Mr. HALL [continuing]. That, but just answer my question.

Ms. MCCABE. We don't believe that moving forward with these regulations will be detrimental to the economy of this country.

Mr. HALL. Well, for the last 3 years EPA has been telling us that they don't intend to implement a cap and trade program to regulate greenhouse gas emissions. And as recently as May 15, I think, of this year Assistant Administrator McCarthy, who is testifying just below us here today, stated, in a response to our committee

that, "Both Former Administrator Jackson and I have said in the past that EPA has no intention of pursuing a cap and trade program for greenhouse gases, and I continue to stand by these statements."

Yet EPA appears to be contemplating a "system based approach" for regulating existing power plants. In a document entitled "Questions for State Partners", which has to do with EPA's planned greenhouse gas regulations for existing power plants, EPA asked questions relating to measures like this: resource planning requirements, end use energy, efficiency resource standards, renewable energy portfolio standards, and appliance and building code energy standards. These measures seem to me, and maybe I am wrong about it, but they seem to me that they are the types of programs that were included in the cap and trade legislation that was rejected by this Congress, I think, some 2 or 3 years ago, and I think you are aware of that.

Ms. MCCABE. Yes.

Mr. HALL. Looking at EPA's documents, that sounds like a back door cap and trade. And I will just ask you these questions, just get right to the point. Talking about the planned greenhouse regulations for existing plants, is the EPA considering requiring states to adopt these types of programs?

Ms. MCCABE. No, Congressman, this is not a cap and trade program at all. This is a program that allows states to develop flexible state plans.

Mr. HALL. Well, you aren't whatever you are acting, in whatever positions you take. And when EPA says the agency, "has no intention of pursuing a cap and trade program for greenhouse gases", does that just mean at the national level?

Ms. MCCABE. Well, it is not up to us to develop the state plans. We are not developing a cap and trade program, nor will we require any state to put one in place.

Mr. HALL. Well, that is my next question. I thank you for answering it. Might EPA effectively require it at the state level?

Ms. MCCABE. It would be entirely up to the state how they would want to approach—

Mr. HALL. OK.

Ms. MCCABE [continuing]. Meeting the target.

Mr. HALL. I think that—

Ms. MCCABE. A cap and trade program is not required.

Mr. HALL. I think that is fair enough, and I thank you for your time.

Mr. WHITFIELD. Well, thank you, Mr. Hall, and I think that concludes our questioners, and I am sure the people on the third panel are delighted with that.

Ms. McCabe, before you go, I want to ask one question, or just follow up on Mr. Gardner. Is it your opinion, your belief, that the states have the actual authority to set the performance standards for existing plants? Or are you saying EPA will set the standard of performance for existing plants in the states?

Ms. MCCABE. EPA will set the target, but then the states will have flexibility to meet that in whatever way makes sense to them. So it does not need to be a unit by unit regulation, or expectation.

Mr. WHITFIELD. And you all are working on this already, even though you are not expected to have it until the summer of 2015, is that correct?

Ms. MCCABE. Well, our proposal will be out in June of 2014. We are gathering information right now in order to inform the proposal that we will—

Mr. WHITFIELD. OK.

Ms. MCCABE [continuing]. Put together.

Mr. WHITFIELD. OK. Well, thank you very much, and we look forward to your coming back and spending more time with us.

Ms. MCCABE. All right. Thank you.

Mr. WHITFIELD. Yes.

At this time I would like to call up the third panel of witnesses, and I want to thank them for their patience, and for the long distance that they have come. We appreciate that.

First of all, we have the Honorable Scott Pruitt, who is the Attorney General from the great State of Oklahoma. We have the Honorable Henry Hale, who is the mayor of Fulton, Arkansas, which I believe is the location of the Turk plant, near Texarkana. We have Mr. Tony Campbell, who is CEO and President of the East Kentucky Power Cooperative. We have Ms. Susan Tierney, who is Managing Principal of the Analysis Group. We have Mr. David Hawkins, who is the Director of Climate Programs at the Natural Resources Defense Council. We have Mr. Ed Chichanowicz, who is an engineering consultant. We have Dr. Donald R. van der Vaart, Chief, Permitting Section, North Carolina Department of Environment and Natural Resources, Division of Air Quality. And we have Mr. Ross Eisenberg, who is Vice-President of Energy and Resources Policy at the National Association of Manufacturers.

Thank you for being here, and I will recognize each one of you for 5 minutes for your opening statement, and then we will have some questions for you.

So, Attorney General Pruitt, we will recognize you first. Thanks for being with us today, and you are recognized for 5 minutes.

STATEMENTS OF HON. E. SCOTT PRUITT, ATTORNEY GENERAL, STATE OF OKLAHOMA; HON. HENRY HALE, MAYOR, FULTON, ARKANSAS; TONY CAMPBELL, PRESIDENT AND CEO, EAST KENTUCKY POWER COOPERATIVE; SUSAN F. TIERNEY, MANAGING PRINCIPAL, ANALYSIS GROUP; DAVID HAWKINS, DIRECTOR OF CLIMATE PROGRAMS, NATURAL RESOURCES DEFENSE COUNCIL; J. EDWARD CICHANOWICZ, ENGINEERING CONSULTANT; DONALD R. VAN DER VAART, CHIEF, PERMITTING SECTION, NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF AIR QUALITY; AND ROSS E. EISENBERG, VICE PRESIDENT, ENERGY AND RESOURCES POLICY, NATIONAL ASSOCIATION OF MANUFACTURERS

STATEMENT OF HON. E. SCOTT PRUITT

Mr. PRUITT. Chairman Whitfield, Congressman McNerney, and members of the subcommittee, good morning, and thank you for the invitation to join you today to discuss concerns, from a state perspective, of the EPA's proposed standards of greenhouse gas

emissions on new power plants. This is an issue of great concern for Oklahoma and other states who were given authority by Congress to develop and implement emissions standards from existing power plants.

In recent years the EPA has expressed an unwillingness to appropriately defer to state authority under the Clean Air Act. The prospect of aggressive performance standards for coal based power plants is a cause for serious concern among the various states. The EPA has indicated a similarly aggressive approach to existing coal based power plants, for which the President has directed the EPA to propose standards by June 1 of 2014, and to finalize those rules by June 1 of 2015.

While the Clean Air Act gives the EPA the authority to develop the framework for the states to establish emission standards for existing power plants, the EPA may not dictate to the states what those standards should be. The states are allowed to engage in a cost benefit analysis, and consider a wide range of factors in setting those standards. This is important to note because the EPA's new emission standard, under the guise of "flexible approaches", mandates new coal based power plants use costly carbon capture storage technology. This is technology that likely remains commercially unviable for at least a decade.

The U.S. Energy Information Administration projects coal-based electric generation will provide 40 percent of base load energy in this country in 2014. The elimination of coal based electric generation would result in higher electricity prices for our ratepayers. It would be detrimental to the national and state economies, as well as job creation, and other things. Increased electricity prices also will hurt the competitiveness of American manufacturing. I, and the Attorney Generals of 16 other states, recently submitted to the EPA a white paper outlining those concerns, and our position on both the EPA and the states' role under Section 111(d) of the Clean Air Act. I have submitted that white paper to you this morning.

Unfortunately, this is not the only issue at which the states and the EPA are at odds over the scope of their respective responsibilities. The Congressman from Colorado referenced the Regional Haze program. Many states, including Oklahoma, are actively engaged in legal challenges to thwart the EPA's attempt to expand its authority under the Regional Haze program. Under the Clean Air Act's Regional Haze rules, a target date of 2064 was set to achieve natural visibility in federally designated areas across the country. Regional Haze deals with issues of aesthetics, not health, and visibility, and safety of the public health. As such, the Clean Air Act gives states the primary role in establishing regulations.

In Oklahoma, stakeholders joined together, worked with utilities, to construct a plan for Regional Haze, and submitted that in 2010, that allowed for fuel diversity, and balanced environmental protection and the need for affordable energy. Our state plan accomplished those objectives for the Regional Haze rule, and exceeded the target date of 2064 by nearly 4 decades. The EPA rejected Oklahoma's state implementation plan in favor of a federal implementation plan, which would cost the state utilities almost \$2 billion within 3 years. What is more, the federal plan would provide less environmental benefits than the state plan, and is estimated

to increase costs for Oklahoma ratepayers by as much as 20 percent.

Our state made the decision to sue the EPA over its decision. This is a case of first impression under the Regional Haze rule adopted in 2005, and will likely potentially end up before the U.S. Supreme Court. Many states are monitoring that case, as the decision will impact their ability to set policy within their jurisdiction.

There is a great deal of frustration among the states with the EPA's attitude, that it ignores the proper role of the states as the agency attempts to expand its authority. The EPA seems to have a view that the states are merely a vessel to implement whatever policies and regulations the administration sees fit, regardless of the wisdom, cost, or efficiency of such measures. Fortunately, for the states, that is not what the law allows. Congress clearly intended for the states to have primacy in the areas of environmental regulation, and for the EPA to work with the states closely to regulate those issues. However, the EPA is attempting to usurp the role of the states, all in the name of imposing the administration's anti-fossil fuel mentality.

The extent and form of greenhouse gas regulation is important to the states. The states have the experience, expertise, and ability to regulate those issues, and must be allowed to play their proper roles established by Congress. We hope that by making our concerns known here today and beyond that the EPA will respect the principles of cooperative federalism, something that has been talked about here today, that are all set forth in the Clean Air Act, and take a more common sense approach to any new regulations, and include the states in that process. If not, we will attempt to obtain relief from the courts, and we will certainly welcome Congressional oversight being brought to bear on these federal agencies.

I look forward, Mr. Chairman, to answering any questions you may have today and others, and thank you for the time this morning.

[The prepared statement of Mr. Pruitt follows:]

Testimony before the Subcommittee on Energy and Power of the House
Committee on Energy and Commerce

“EPA’s Proposed GHG Standards for New Power Plants and H.R. __,
Whitfield-Manchin Legislation”

November 14, 2013

E. Scott Pruitt
Attorney General
State of Oklahoma

Dear Chairman Whitefield, Ranking Member Rush, and Members of the Subcommittee,

Good morning and thank you for the invitation to join you today to discuss concerns – from a state perspective – of the EPA’s proposed standards for greenhouse gas emissions of new power plants. This is an issue of great concern for Oklahoma and other states who were given the authority by Congress under the Clean Air Act to develop and implement emission standards for existing power plants.

In recent years, the EPA has expressed an unwillingness to appropriately defer to state authority under the Clean Air Act. The prospect of aggressive performance standards for new coal-based power plants is cause for serious concern among the states.

The EPA has indicated a similarly aggressive approach to existing coal-based power plants, for which the President has directed the EPA to propose standards by June 1, 2014, and to finalize the rules by June 1, 2015.

While the Clean Air Act gives the EPA the authority to develop the framework for states to establish emissions standards for existing power plants, the EPA may not dictate to the states what those standards should be.

The states, in making these important decisions, are allowed to engage in a cost-benefit analysis and consider a wide range of factors in setting standards. This is important to note, as the EPA’s new emission standard, under the guise of “flexible approaches,” mandates new coal-based power plants use costly carbon capture storage technology, which likely remains commercially unviable for at least a decade.

The elimination of coal-based electric generation – which according to the U.S. Energy Information Administration is projected to provide 40 percent of U.S. electricity in 2014 – would result in higher electricity prices for ratepayers, and would be detrimental to the national and

state economies, as well as job-creation in general. No doubt, increased electricity prices will hurt the competitiveness of American manufacturing.

I and the attorneys general of 16 other states – and the senior environmental regulator of an 18th state – recently submitted to EPA Administrator Gina McCarthy a white paper outlining these concerns and our position on both the EPA and the states’ role under Section 111(d) of the Clean Air Act.

Unfortunately, this is not the only issue at which the states and EPA are at odds over the scope of their respective responsibilities. Many states, including Oklahoma, are actively engaged in legal challenges to thwart the EPA’s attempt to expand its authority under the Regional Haze Rule.

Under the Clean Air Act’s Regional Haze rules, a target date of 2064 was set to achieve “natural visibility” in federally designated lands across the United States. Since Regional Haze deals with issues of aesthetics and visibility – and not safety or public health – the Clean Air Act gives states the primary role in establishing regulations.

In Oklahoma, stakeholders worked with utilities to construct a plan for regional haze that allows for fuel flexibility and balances environmental protection with the need for affordable energy. Our state plan accomplished the objectives of the regional haze rule and exceeded the target date by nearly four decades (38 years). However, the EPA rejected Oklahoma’s state implementation plan in favor of a federal implementation plan, which could cost state utilities \$2 billion, leaving Oklahoma consumer to foot the bill.

What’s more, the federal plan would provide less environmental benefits than the state plan and is estimated to increase costs for Oklahoma ratepayers as much as 20 percent annually.

Our state made the decision to sue the EPA over its decision. This is a case of first impression that likely could wind up at the Supreme Court level. Many states are monitoring the case closely, as the decision will impact their ability to set policy within their jurisdictions.

There is a great deal of frustration among the states with the EPA's attitude that ignores the proper role of the states as the agency attempts to expand its authority. The EPA seems to view the states as merely a vessel to implement whatever policies and regulations the Administration sees fit, regardless of the wisdom, cost, or efficiency of such measures.

Fortunately for the states, that is not what the law allows. Congress clearly intended for the states to have primacy in the areas of environmental regulation and for the EPA to work closely with the states to regulate these issues. However, the EPA is attempting to usurp the role of the states in the name of imposing the administration's anti-fossil fuel agenda.

The extent and form of greenhouse gas regulation is important to the states. The states have the experience, expertise, and ability to regulate these issues and must be allowed to play their proper roles in making the significant policy judgments that are required in adopting any such regulation.

We hope that by making our concerns known, the EPA will respect the principles of cooperative federalism that are set forth in the Clean Air Act and take a more commonsense approach to any new regulations and include the States in the process. If not, we will attempt to obtain relief from the Courts, and we also certainly welcome Congressional oversight being brought to bear on federal agencies.

Thank you for affording me the opportunity to present these concerns. Please see attached for your review the white paper titled, Perspective of 18 States on Greenhouse Gas Emission Performance Standards for Existing Sources under § 111(d) of the Clean Air Act."

Sincerely,

A handwritten signature in black ink, appearing to read "E. Scott Pruitt". The signature is stylized with a large, looped "E" and a long horizontal stroke extending to the right.

E. SCOTT PRUITT

ATTORNEY GENERAL OF OKLAHOMA

**Perspective of 18 States on Greenhouse Gas Emission Performance Standards
for Existing Sources under § 111(d) of the Clean Air Act.**

Introduction

As State Attorneys General, we believe it is critical to bring public awareness to another example of what has unfortunately become routine: the United States Environmental Protection Agency (“EPA” or “Agency”) is poised to yet again propose new regulations that venture well beyond the limits of the agency’s authority. The President has called upon EPA to propose greenhouse gas (GHG) emission standards, regulations, or guidelines for *existing* power plants by June 1, 2014, and to finalize those rules by June 1, 2015. As this paper will show, EPA’s authority under the Clean Air Act is limited to developing a procedure for *states* to establish emissions standards for existing sources. EPA, if unchecked, will continue to implement regulations which far exceed its statutory authority to the detriment of the States, in whom Congress has vested authority under the Clean Air Act, and whose citizenry and industries will ultimately pay the price of these costly and ineffective regulations.

Last year, EPA published a proposed rule regulating carbon dioxide (“CO₂”) emissions from new electric utility generating units (“EGUs”). 77 Fed. Reg. 22,392 (April 13, 2012) (“EGU NSPS”). In light of recent comments from industry, EPA is considering the need to re-propose this standard due to its failure to finalize the action within the CAA’s 1-year timeframe. In addition, on April 15 and 17, 2013, some states and environmental groups filed 60- and 180-day Notices of Intent to sue EPA under section 304(a) of the Clean Air Act (“CAA”) for failure to perform the allegedly non-discretionary duty of and/or unreasonably delaying finalizing the

EGU NSPS and proposing standards for existing EGUs.¹ In response to these Notices, a coalition of Attorneys General has requested to be involved in any settlement discussions with advocates of broad federal GHG regulations.

EPA states that once it has issued regulations for an air pollutant from *new* sources in a particular source category under the CAA § 111(b), it has legal authority to regulate emissions from *existing* sources of that air pollutant within the same source category.² The final version of the new source performance standards for new EGUs will likely face legal challenge. However, the following analysis assumes the final EGU NSPS for GHG emissions is upheld and EPA moves forward with rulemaking for existing sources.

The purpose of this paper is to identify a timely example of a serious, ongoing problem in environmental regulation: the tendency of EPA to seek to expand the scope of its jurisdiction at the cost of relegating the role of the States to merely implementing whatever Washington prescribes, regardless of its wisdom, cost, or efficiency in light of local circumstances. The issue is not new. The States and EPA have been at odds over the scope of their respective responsibilities under the federal environmental statutes since the statutes' inception. The recent increase in the level of federal regulatory activity under the Clean Air Act has generated a

¹ A settlement agreement entered into by a number of states and environmental groups in December 2010 set forth deadlines for EPA to issue regulations with respect to GHG emissions from existing EGUs. See, 75 Fed. Reg. 82,392 (Dec. 20, 2010). The deadlines have passed.

² The authority of EPA to promulgate GHG NSPS for existing EGUs, even if it finalizes its proposed GHG NSPS rule for new EGUs, has been questioned. See William J. Hann, *The Clean Air Act as an Obstacle to the Environmental Protection Agency's Anticipated Attempt to Regulate Greenhouse Gas Emissions from Existing Power Plants*, THE FEDERALIST SOCIETY (Mar. 2013), available at <http://www.fed-soc.org/publications/detail/the-clean-air-act-as-an-obstacle-to-the-environmental-protection-agencys-anticipated-attempt-to-regulate-greenhouse-gas-emissions-from-existing-power-plants>. Without conceding that EPA does have authority to promulgate a GHG NSPS for existing EGUs, we assume for purposes of discussion here that EPA does have that authority and will exercise it.

corresponding increase in concerns among the States regarding the preservation of their role in environmental protection.

The way in which EPA has “pushed the envelope” in interpreting its legal authority under the CAA to promulgate a New Source Performance Standard for new EGUs portends a similarly aggressive and unlawful approach to the regulation of existing EGUs. EPA’s clear policy goal in establishing its new source standards is to prevent the construction of new coal plants. EPA’s proposed EGU NSPS would foreclose the construction of new coal-based electric generation absent carbon capture and storage (“CCS”), yet CCS is likely to remain commercially infeasible for a decade or more. The elimination of coal as a fuel for new electric generation would have highly concerning implications for electricity prices and for the economy and job-creation in general, as well as the competitiveness of American manufacturing.

In order to justify its proposed standard that would not allow new coal-based EGUs absent CCS, EPA has taken unprecedented steps. The Agency proposed to combine coal and combined-cycle natural-gas units into a single regulatory category, something it has never done before for coal and gas EGUs. Indeed, it did not even go so far as recently as last year when it proposed NSPS for traditional pollutants emitted by EGUs. EPA’s aggressive posture in its proposed new-source NSPS, both as to foreclosing new coal plants and in pushing the scope of its claimed legal authority, raises serious questions as to the approach EPA will eventually take when it promulgates existing-source NSPS.

If EPA proceeds against existing coal plants with the same hostility, it is likely to be reversed in court. As this paper shows, EPA does not have authority to promulgate prescriptive limitations for existing coal-fueled EGUs. Under section 111(d) of the CAA, EPA must recognize that States have broad discretion to determine the nature of NSPS requirements for

existing EGUs. EPA may require States to adopt standards, and EPA may guide how States do so procedurally, but the States are vested with the legal authority to decide the ultimate standards.

The Statutory and Regulatory Framework For Developing Performance Standards For Existing Sources

The focus of the following analysis is the limitations Congress placed on EPA's authority under Section 111(d) of the CAA. Section 111(d) provides EPA with the authority to develop standards of performance for existing sources and directs the Agency to:

prescribe regulations which shall establish a procedure similar to that provided by section 7410 of this title under which each State shall submit to the Administrator a plan which establishes standards of performance for any existing source for any air pollutant...to which a standard of performance under this section would apply if such existing source were a new source.

Section 111(d) requires the existence of a performance standard for new sources as a condition precedent to the development of such standards for existing sources. Thus, the legality of the final version of EPA's EGU NSPS rule has significant implications for EPA's ability to require regulation of existing EGUs.

Most importantly, section 111(d) invokes the principle of cooperative federalism -- with roles clearly delineated for both EPA and the States. The reference to § 110 refers to the general process by which States submit their State Implementation Plans ("SIPs") for EPA review. Accordingly, EPA's authority under § 111(d) is limited to establishing, in the statute's term, a "*procedure*" by which the States submit plans for regulating existing sources. EPA cannot promulgate rules establishing the substantive standards to be imposed on existing sources.

The cooperative federalism is illustrated by EPA's general procedural regulations relating to the States' adoption and submittal of plans establishing standards of performance for existing

sources. Those regulations require EPA to issue a “guideline document” concurrently with, or after, the “proposal of standards of performance for the control of a designated pollutant from affected facilities.” 40 C.F.R. § 60.22(a). The content of the guideline document is of great importance to the preservation of the States’ role in the development of performance standards for existing sources.

Under EPA’s regulations, the guideline document is to “provide information for the development of State plans” including a “description of systems of emissions reduction which, in the judgment of the Administrator, have been adequately demonstrated.” *Id.* at (b)(2). The guideline document also shall contain an “emission guideline” providing “criteria for judging the adequacy” of § 111(d) plans. 40 C.F.R. § 60.22(b)(5); *see*, 40 Fed. Reg. 53,341 (Nov. 17, 1975). The emission guideline “reflects the application of the best system of emission reduction (considering the cost of such reduction) that has been adequately demonstrated.” 40 C.F.R. § 60.22(b)(5). The emission guideline must also allow sub-categorization “when costs of control, physical limitations, geographical location, or similar factors make [it] appropriate.” *Id.*

Also under EPA’s regulations, the States have nine months to submit a “plan for the control of the designated pollutant to which the guideline document applies.” 40 C.F.R. § 60.23(a)(1). The plan “shall include emission standards” that “shall prescribe allowable rates of emissions except when it is clearly impracticable.” 40 C.F.R. § 60.24(a), (b)(1). The States have significant discretion in formulating these plans. Although the “emission standards” are to be “no less stringent than the corresponding emission guideline(s), the States may make a case-by-case determination that a specific facility or class of facilities should be subject to a less-stringent standard or longer compliance schedule due to 1) cost of control; 2) physical limitation of installing necessary control equipment; and 3) other factors making the less-stringent standard

more reasonable. *See*, 40 C.F.R. § 60.24(c), (f). EPA then has four months to determine whether the plan meets the requirements discussed above. If EPA disapproves the plan, the State may correct the deficiencies or, under EPA's construction, the Agency may issue its own plan within 6 months of the original submission deadline. *See*, 40 C.F.R. § 60.27(c), (d).

Although these regulations have never been tested in court, EPA undoubtedly has power to adopt procedural regulations governing State adoption of plans setting forth performance standards. But, importantly, and consistent with the statute, the determination of the actual substantive standards is left to the states.

Existing Source Performance Standards for CO₂ Emissions from EGUs

In contemplating regulation of existing EGUs, however, EPA appears poised to go beyond the establishment of procedures and usurp the states' authority by setting minimum *substantive* requirements for state performance standards. Having reviewed the statutory and regulatory requirements for developing standards of performance for existing sources in a general sense, we now apply that legal framework to CO₂ emissions from EGUs. Although EPA has not yet issued a proposed guideline document for CO₂ emissions from existing EGUs, we offer general observations about potential issues that have already presented themselves.

Fundamentally, § 111(d), as well as EPA's own regulations, require that emission reductions be made through adequately demonstrated systems of emission reduction technology. Under § 111(d), EPA establishes procedures for States to submit plans containing "performance standards." "Performance standards" is defined in § 111(a): "The term 'standard of performance' means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and

environmental impact and energy requirements) the Administrator determines *has been adequately demonstrated.*” (Emphasis supplied). And EPA’s guideline document and the emission guideline contained therein are to “reflect[] the application of the best system of emission reduction (considering the cost of such reduction) that has been adequately demonstrated.” 40 C.F.R. § 60.22(b)(5); *see also*, 42 U.S.C. § 7411(1) (definition of “standard of performance”). The crux of this requirement thus is that the system be, in fact, adequately demonstrated.

It seems incontrovertible that no post-combustion reduction system has been “adequately demonstrated” for CO₂ emissions from EGUs on a broad, commercial scale. A system of carbon capture and storage is perhaps a decade away from being technologically and economically feasible. A permitting system for storing CO₂ emissions underground and a set of legal rules governing liability for CO₂ storage has not been put in place in most states. Without an adequately demonstrated post-combustion control technology, EPA must look to standards based on cost-effective efficiency improvements at electric generating units, because more efficient units will produce lower CO₂ emissions per unit of heat input or electricity output.

EPA and others may believe that efficiency measures will not ensure the amount of CO₂ emission reductions they desire. As a result, some groups have proposed EPA be given flexibility to develop emission guidelines based on trading programs with statewide emissions caps, increased reliance on lower CO₂ emitting facilities, or demand-side and non-regulated source reductions. In short, EPA may attempt to force coal-fueled EGUs to decrease operation time or retire early, or force utilities to rely more heavily on natural gas and other resources in an effort to ensure greater CO₂ emission reductions. Such proposals, often offered as ways of providing “flexibility,” do not conform to the limitations Congress has placed on EPA in the

Clean Air Act, nor do they properly preserve the primary role of States in the development of standards of performance for existing sources. Under § 111(d), it is the States, not EPA, that are authorized to adopt performance standards; therefore it is the States, not EPA, that weigh the § 111(a)(1) factors to determine what technology is adequately demonstrated. Simply put, EPA lacks statutory authority (and is limited by its own regulations) to issue emission guidelines seeking reductions of CO₂ emissions from coal-based EGUs in a manner based on something other than an adequately demonstrated reduction system for such EGUs.

To the extent § 111(d) provides authority for flexible approaches to establishing performance standards to seek reductions in CO₂ emissions, that authority is vested in States, not EPA. And of course, under § 116, States retain authority to adopt more stringent CO₂ controls than EPA has the authority to mandate.

As noted, § 111(d) specifies that EPA's regulatory authority is limited to developing a *procedure* for the submission of state plans. EPA's general regulations authorizing the issuance of emission guidelines that establish minimum requirements, depending on how EPA implements this guideline authority in a particular case, bear on substantive standard-setting. But EPA does not have the authority to establish minimum substantive requirements.

EPA cannot dictate substantive outcomes. The agency can require that States actually adopt performance standards based on application of the § 111(a)(1) factors.

States are additionally afforded the discretion to consider "among other factors, the remaining useful life of the existing source to which such standard applies" when developing performance standards for existing units. Beyond this, § 111(d) does not provide authority for EPA to reject a State plan if it does not contain a standard of performance as that term is defined, and based on the factors set forth, in § 111(a)(1).

In sum, the CAA imposes responsibility for air pollution control at the State and local levels because of the proximity to existing sources and familiarity with local operating conditions. State implementation plans are thus the primary architecture of emission controls. See §§ 107(a); 110(a); 111(d). The “structure of the CAA militates against reading an extra-statutory requirement into the Act’s limitations on state discretion. Because the states enjoy ‘wide discretion’ in implementing the Act, the imposition of newfound restrictions upsets the Act’s careful balance between state and federal authority. *Union Elec. Co.*, 427 U.S. at 250; see also *Fla. Power & Light Co.*, 650 F.2d at 587 (‘The great flexibility accorded the states under the Clean Air Act is . . . illustrated by the sharply contrasting, narrow role to be played by EPA.’).” *Luminant Generation Co. v. EPA*, 675 F.3d 917, 929 (5th Cir. 2012). EPA’s role for existing sources is therefore “confine[d]...to the ministerial function of reviewing SIPs for consistency with the Act’s requirements.” *Luminant Generation Co. v. EPA*, 675 F.3d 917, 921 (5th Cir. 2012).

Conclusion

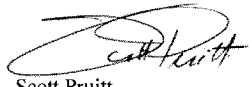
The prospect for EPA adoption of GHG performance standards for new or existing coal-based EGUs raises serious concerns. EPA’s aggressive standards for new coal-based EGUs indicate a similarly aggressive approach to existing coal-based EGUs. While EPA is authorized to require States to submit plans containing performance standards, EPA may not dictate what those performance standards shall be. Nor may EPA require States to adopt GHG performance standards that are not based on adequately demonstrated technology or that mandate, in the guise of “flexible approaches,” the retirement or reduced operation of still-viable coal-based EGUs.

These concerns are serious. EPA regulations may harm the nascent economic recovery. Moreover, our federalist system of government, as implicated in the CAA, requires that EPA

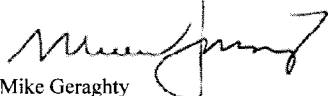
recognize the rights and prerogatives of States. The extent and form of greenhouse gas regulation is important to the States; it is critical that States be allowed to play their proper roles in making the significant policy judgments that are required in adopting any such regulation.



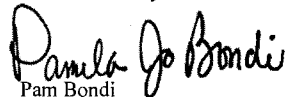
Jon Bruning
Nebraska Attorney General



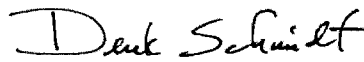
Scott Pruitt
Oklahoma Attorney General



Mike Geraghty
Alaska Attorney General



Pam Bondi
Florida Attorney General



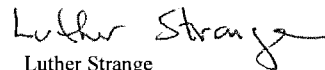
Derek Schmidt
Kansas Attorney General



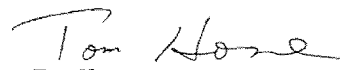
Tim Fox
Montana Attorney General



Bill Schuette
Michigan Attorney General



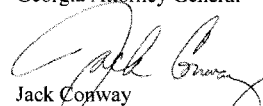
Luther Strange
Alabama Attorney General



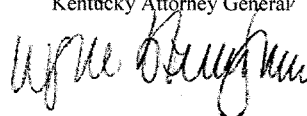
Tom Horne
Arizona Attorney General



Sam Olens
Georgia Attorney General



Jack Conway
Kentucky Attorney General



Wayne Stenehjem
North Dakota Attorney General



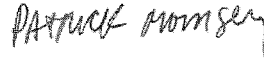
Mike DeWine
Ohio Attorney General



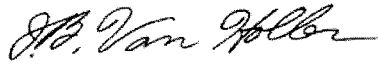
Alan Wilson
South Carolina Attorney General



Marty Jackley
South Dakota Attorney General



Patrick Morrissey
West Virginia Attorney General



J.B. Van Hollen
Wisconsin Attorney General
of Environmental Management



Tom Easterly
Commissioner, Indiana Department
of Environmental Management

Mr. WHITFIELD. Thank you, Mr. Pruitt.
 Mayor Hale, you are recognized for 5 minutes, and just be sure to put your microphone on so we can hear you.

STATEMENT OF HON. HENRY HALE

Mr. HALE. Chairman Whitfield, and members of this committee, it is a great honor to sit here today and testify before the committee about the Southwestern Electric Power Company, a unit of American Electric Power, which began serving customers back in 1912, made the announcement in 2006 to build a power plant in Southwest Arkansas, the John W. Turk Plant, which later became the single largest project ever constructed in the county where I live, with a capital investment of \$1.8 billion. Hempstead County, which had been around for 195 years, founded in 1818, is eternally grateful to SWEPCO and AEP for their decision to build just a mile or two up the road from my hometown. The plant went into commercial operation on December the 20th, 2012.

SWEPCO went to great length to overcome major environmental and legal challenges in building Turk, one of the cleanest, most efficient coal fueled electric generating plants in North America. It was the culmination of 6 years of successful engineering, construction, legal, and regulatory effort. Turk is an example of how well planned teamwork and coordination can make a project of this magnitude come together. It is the first power plant in the U.S. to use ultra-supercritical steam technology, which requires a plant to use less coal, thereby lower the level of emissions, including carbon dioxide, sulfur dioxide, nitrogen oxide, and mercury.

The Turk plant is a 600 megawatt facility that provides operation 24 hours a day to meet the growing electrical needs of SWEPCO and co-op customers in Arkansas, Louisiana, and Texas. SWEPCO realizes how important it is to plan for the future energy supply for our states, community, and customers.

The Turk plant is good for the local economy. While America was enduring difficult economic times, the Turk plant provided construction jobs for a peak of over 2,000 workers, and bring tax revenue to local government. Construction alone generates \$38 million in sale and property revenue. The plant has 109 permanent jobs, with an annual payroll of \$9 million. The plant pays about \$6 million in annual school, and county, and property tax. I certainly appreciate the tax support generated to the local school district, which I am an employee.

But it is not about the plant. SWEPCO gave the local college, the University of Arkansas Community College at Hope, a \$1 million grant to start up a power plant technology degree program early on in the process. Hundreds have graduated, and many are able to get jobs at Turk Plant, enhancing education in a part of the State of Arkansas that desperately needed it in recent years. The Turk team impacts the local community in a positive way with toy drives, park improvement for nearby Hope, Fulton, and McNab. Construction workers and SWEPCO employees also, on site, gave their time, money, and materials to improve the lives of others in the area.

The Turk Plant has won several awards this year, including the Edison Award, from Edison Electric Institution, the 2013 Plant of

the Year Award from Power Magazine, and 2012 Project of the Year in the Best Coal Fuel Project category from Power Plant.

I thank you for allowing me to speak to you this day. Thank you.
[The prepared statement of Mr. Hale follows:]

Testimony of Mayor Henry Hale
Before the Subcommittee on Energy and Power Regarding
“EPA’s Proposed GHG Standards for New Power Plants and H.R. __,
Whitfield-Manchin Legislation”

November 14, 2013

Chairman Whitfield and other distinguished members of the subcommittee, my name is Henry Hale and I am the mayor of Fulton, Arkansas, which is located in Hempstead County.

Southwestern Electric Power Company, a unit of American Electric Power, which began serving customers back in 1912, made the announcement in 2006 to build a power plant in Southwest Arkansas. The John W. Turk, Jr. Power Plant would later become the single largest project ever constructed in the county where I live, with a capital investment of \$1.8 billion. As you know, the plant went into commercial operation on December 20, 2012. The citizens of Hempstead County are proud that SWEPCO and AEP made the decision to build the Turk plant in our county.

SWEPCO went to great lengths to overcome major environmental and legal challenges and build Turk, one of the cleanest, most efficient, and

most advanced coal-fueled electric generating plants in North America. It was the culmination of six years of successful engineering, construction, legal and regulatory efforts. Turk is an exceptional example of how well-planned teamwork and coordination can make a project of this magnitude come together. It's the first power plant in the U.S. to use ultra-supercritical steam technology, which allows the plant to use less coal, thereby lowering emissions, such as carbon dioxide. The Turk Plant is a 600-megawatt facility that operates 24 hours a day to meet the growing electrical needs of SWEPCO and co-op customers in Arkansas, Louisiana and Texas. SWEPCO realizes how important it is to plan for the future energy supply for our states, communities and customers.

Besides providing affordable and reliable electricity from coal, the Turk plant is good for the local economy. While Americans have been enduring difficult economic times, the Turk Plant has provided construction jobs for a peak of over two thousand workers, and has brought much needed tax revenue to local governments. Construction alone generated \$38 million in sales and property tax revenues. The plant has 109 permanent jobs with an annual payroll of \$9 million. The plant pays \$6 million in annual school and county property taxes. As an

employee of the local school district, I have seen firsthand how the taxes paid by Turk have benefitted our students.

But it's not all about the Turk plant itself. SWEPCO gave the local college, the University of Arkansas Community College at Hope, a \$1 million dollar grant to start a power plant technology degree program. Hundreds have now graduated from the program, enhancing education in a part of the State of Arkansas that desperately needed it in recent years. Many of the graduates are now employees at the Turk Plant. The Turk team has also helped the local communities with toy drives and park improvements for nearby Hope, Fulton and McNab. Construction workers and SWEPCO employees gave of their time, money and materials to improve the lives of others in the area.

The Turk Plant has won several awards, including The Edison Award from Edison Electric Institute; the 2013 Plant of the Year Award from Power Magazine; and the 2012 Project of the Year in the Best Coal-Fueled Project Category from Power Engineering.

Thank you for allowing me to speak before you today about the benefits of the Turk plant to the local communities and to the customers who

rely on the plant for clean and reliable electricity. I will be pleased to answer any questions you might have.

Mr. WHITFIELD. Mayor, thanks so much.
And, Mr. Campbell, you are recognized for 5 minutes.

STATEMENT OF TONY CAMPBELL

Mr. CAMPBELL. Chairman Whitfield, Ranking Member McNerney, and members of the subcommittee, thank you for the opportunity to appear before you today. My name is Tony Campbell. I am President and CEO of East Kentucky Power Cooperative, and I have served in that position since 2009.

East Kentucky Power Cooperative is a generation and transmission cooperative based in Winchester, Kentucky. East Kentucky Power Cooperative, and its 16 owner-member cooperatives, exist to serve the end consumer. East Kentucky Power Cooperative generates electricity at three base load power plants fueled by coal, and one peaking plant fueled by natural gas. More than 90 percent of the power that is generated is fueled by coal. East Kentucky Power Cooperative's total generating capacity is about 3,000 megawatts, and we employ about 700 employees. More than one million Kentucky residents and businesses in 87 counties depend on the power we generate. We also serve some of the neediest Kentuckians. The household income of Kentucky Cooperative members is 7.4 percent below the state average, and 22 percent below the national average.

East Kentucky Power Cooperative supports the bipartisan Whitfield-Manchin discussion draft bill as common sense legislation that provides important guidelines and parameters for EPA to follow in developing greenhouse gas regulations for new and existing power plants without causing irreparable harm to the U.S. economy. This bipartisan bill is badly needed to ensure EPA does not promulgate a rule that jeopardizes the country's energy future, puts electricity reliability at risk, and severely harms the economy.

While East Kentucky Power Cooperative sympathizes with the need to address climate change issues on a global scale, we should not impose immediate changes to this country's electric infrastructure, forcing utilities to rely on undeveloped technologies as the answer. That risk may prove greater than the issue it was intended to solve.

Congress never intended for the Clean Air Act to regulate greenhouse gas emissions from power plants. This fact is illustrated by EPA's attempts to promulgate greenhouse gas new source performance standards under Section 111. The administration's proposed greenhouse gas performance standards, first issued in April 2012, demonstrated unequivocally that the administration sought to end new coal generation through regulation. In that proposal, EPA chose not to establish a separate standard for coal-fired units. Instead, it lumped coal units together with natural gas fired units into a new new source performance standard subcategory, and established a greenhouse gas emission limit that only some natural gas combined cycle units can achieve.

These proposed Section 111 regulations have already had a chilling impact on electricity generation in the U.S. While the current low price of natural gas has contributed to the decline in coal-fired electricity generation, and the resurgence of natural gas fired units, EPA's new regulations are an equally important factor in

this trend. In recent years, electric utilities have faced a daunting array of environmental regulations on all fronts, air, water, and waste, that have contributed to the widespread coal-fired unit retirements. Coal fired generation is essential to ensure energy diversity, and to keep the electricity prices low.

There is also a significant national security issue that I would like to highlight for you. In addition to the realities and risks of rising natural gas prices, it is simply not feasible or prudent for the nation's entire existing coal-fired generation capacity to be transitioned to natural gas. Natural gas generation requires transportation from natural gas wells to power plants by an intricate network of interstate pipelines and compressor stations that allow the gas to be constantly pressurized. These requirements raise not only infrastructure concerns, but also national security concerns. If a compressor station were to fail, or become the victim of a terrorist attack, the nation's electric grid could be placed in jeopardy.

When these natural gas supply requirements are contrasted with coal, which is plentiful in supply, can be stockpiled at a 30 to 45 day supply, and can be transported by several different methods without the use of interstate pipelines, it makes no sense to require wholesale conversions from coal-fired generation to natural gas, particularly in areas of the country that are rich in coal resources, and are not located in close proximity to natural gas wells.

Coal fired power plants in the U.S. only contribute approximately four percent of the global greenhouse gas emissions. The U.S. power fleet has already reduced CO₂ emissions by 16 percent below 2005 levels, with CO₂ from coal-fired power plants reduced by almost 25 percent. The EPA should allow coal-fired power plants to continue to make these reductions in a reasonable manner, and in response to market pressures, instead of by regulatory fiat.

Furthermore, the regulation at issue will not have a meaningful impact on global climate change. The minimal impact that these regulations will have on the environment further underscores the need for all greenhouse gas regulations to be economically achievable. While East Kentucky Power Cooperative has significant concerns with the proposed regulations of the new sources, particularly the assumptions on carbon capture and sequestration technology, our greatest concern relates to regulations for existing sources.

Pursuant to the consent decree with the EPA, East Kentucky Power Cooperative has invested almost \$1 billion in retrofitting our existing coal-fired power plants over the last decade with modern air pollution control equipment. In addition, we have invested more than one billion, and installed two new cleanest coal-fired units in the country. An existing source rule that requires carbon capture and sequestration would leave East Kentucky Power Cooperative with no choice but to convert these units to natural gas, essentially wasting the extensive capital investment that we have been forced to make to lower pollutants from the coal-fired units. This would result because there is currently no demonstrated technology that would be able to control greenhouse gas emissions.

Mr. WHITFIELD. Mr. Campbell, your time really has expired. If you would just summarize real quick?

Mr. CAMPBELL. I will summarize. Thank you, Mr. Chairman. To summarize, East Kentucky Power Cooperative appreciates the work of this committee, and the opportunity to present our views of the EPA's regulations on greenhouse gas from power plants. I would like to reaffirm East Kentucky Power Cooperative's support for the Whitfield-Manchin discussion draft bill.

[The prepared statement of Mr. Campbell follows:]

**Testimony of Anthony S. "Tony" Campbell
President & CEO
East Kentucky Power Cooperative**

November 14, 2013

SUMMARY

EKPC is a generation and transmission cooperative based in Winchester, KY. Our mission is to provide safe, reliable, affordable electric power to the 16 electric distribution cooperatives that own EKPC. Nationwide, not for profit electric cooperatives serve 42 million people in 47 states.

We do not believe Congress ever intended for the Clean Air Act to regulate greenhouse gas emissions from power plants.

The proposed Section 111 regulations have already had a chilling impact on electricity generation in the U.S. When that proposed rule was issued, approximately 15 coal-fired power plants had received a PSD permit, but had not yet commenced construction. By the time the rule was withdrawn and re-proposed in 2013, most of those plants had been scrapped due to regulatory uncertainty, despite the exemption EPA included in the proposed rule.

In recent years electric utilities have faced a daunting array of environmental regulations on all fronts – air, water, and waste – that have contributed to widespread unit retirements. Coal-fired generation is essential to ensure energy diversity and to keep electricity prices low. Although natural gas prices are currently low, recent data from the United States Energy Information Administration ("EIA") shows that natural gas prices have increased by more than 50% since April 2012.

In addition to the realities and risks of rising natural gas prices, it is not feasible for the nation's existing coal-fired generating capacity to be transitioned to natural gas. Natural gas generation requires transportation from natural gas wells to power plants via an intricate network of interstate pipelines and compressor stations. These requirements raise infrastructure and national security concerns.

EKPC's greatest apprehension relates to regulations for existing sources. EKPC operates three baseload power plants fueled by coal and one plant operated by natural gas-fired combustion turbines. EKPC has invested almost \$1 billion in retrofitting existing coal-fired power plants with modern air pollution control equipment. Further, EKPC spent another \$1 billion to construct two of the cleanest coal units in the country. An existing source rule that requires CCS would leave EKPC, with no choice but to convert these units to natural gas, essentially wasting the extensive capital investments that have been made to lower pollutants from the coal-fired units.

EKPC is very worried about the supply of electricity to its rural cooperative members and its cost. There is a lack of technology that would allow EKPC to control GHG emissions, and a lack of demonstrated benefits to the environment. Most if not all coal-fired units will be forced to retire as a result of the regulation of GHG emissions, which would astronomically increase electricity rates and ultimately cause further job losses.

**TESTIMONY OF ANTHONY S. "TONY" CAMPBELL
PRESIDENT & CHIEF EXECUTIVE OFFICER
EAST KENTUCKY POWER COOPERATIVE**

**BEFORE THE
SUBCOMMITTEE ON ENERGY AND POWER
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES**

**REGARDING
EPA'S PROPOSED GREENHOUSE GAS STANDARDS
FOR ELECTRIC POWER PLANTS**

November 14, 2013

A. Introduction

Chairman Whitfield, Ranking Member Rush and members of the Subcommittee, thank you for the opportunity to appear before you today. My name is Anthony S. "Tony" Campbell. I am the President and CEO of East Kentucky Power Cooperative ("EKPC"), and I have served in that position since 2009. I have previously served as CEO of Citizens Electric Cooperative in Missouri, and my career has also included positions at Corn Belt Energy and Soyland Power Cooperative, both in Illinois. I have a Bachelor's degree in Electrical Engineering from Southern Illinois University and a Master's degree in Business Administration from the University of Illinois.

Nationwide, not for profit electric cooperatives serve 42 million people in 47 states. While about 12 percent of the nation's meters are members of a rural electric cooperative, those co-ops own and maintain 42 percent of the nation's electric distribution lines, covering three quarters of the nation's landmass. Electric cooperatives employ about 70,000 people nationwide.

EKPC is a generation and transmission cooperative based in Winchester, Ky. Our mission is to provide safe, reliable, affordable electric power to the 16 electric distribution cooperatives that own EKPC. EKPC generates electricity at three baseload power plants fueled by coal and one peaking plant fueled by natural gas. More than 90 percent of the power we generate is fueled by coal. EKPC's total generating capacity is about 3,000 megawatts, and that power is delivered over a network of high-voltage transmission lines totaling about 2,800 miles. EKPC employs about 700 people.

More than 1 million Kentucky residents and businesses in 87 counties depend on the power we generate. Our 16 owner-member cooperatives serve mainly rural areas in the Eastern and Central two-thirds of Kentucky. EKPC and its member cooperatives exist only to serve their members. Our electric cooperatives serve some of the most remote parts of Kentucky. The terrain in this region varies from rolling farmland in Central Kentucky to mountains in the eastern portion. On average, our cooperatives have about 9 consumers per mile of power line,

while investor-owned utilities average 37 consumers per mile and municipal utilities average 48 consumers. We also serve some of the neediest Kentuckians. The household income of Kentucky cooperative members is 7.4 percent below the state average, and 22 percent below the national average.

B. Use of the Clean Air Act to Regulate Greenhouse Gases from Electric Utility Units

Congress never intended for the Clean Air Act to regulate greenhouse gas emissions (“GHG”) from power plants. This fact is illustrated by EPA’s attempts to promulgate GHG new source performance standards (“NSPS”) under Section 111. The Administration’s proposed GHG NSPS, first issued in April 2012, demonstrated unequivocally that the Administration seeks to end new coal generation through regulation. In that proposal EPA chose not to establish a separate standard for coal-fired units; instead, it lumped coal units together with natural-gas fired units into a new NSPS subcategory, and established a GHG emission limit that only some natural gas combined cycle units can achieve. These proposed Section 111 regulations have already had a chilling impact on electricity generation in the U.S. When that proposed rule was issued, approximately 15 coal-fired power plants had received a PSD permit but had not yet commenced construction. By the time the rule was withdrawn and re-proposed in 2013, most of those plants had been scrapped due to regulatory uncertainty, despite the exemption EPA included in the proposed rule. The impact of the proposed GHG NSPS on already permitted new coal plants was fully realized when EPA did not finalize the proposed GHG NSPS rule within a year after proposing it, and instead, re-proposed the rule in September without any exemption for transitional sources. EPA recognized in the preamble to the rule that there are only three new coal units under development that would not include carbon capture and sequestration (“CCS”), the proposed Wolverine project in Michigan, the Washington County project in Georgia, and the Holcomb project in Kansas.

Just last month the Supreme Court agreed to hear a challenge to EPA’s regulations requiring major sources to obtain permits for GHG emissions along with traditional pollutants. The specific issue for which the Court granted certiorari is “whether the Agency’s regulation of GHGs from new motor vehicles triggered permitting requirements under the Clean Air Act for stationary sources.” This case, *Utility Air Regulatory Group v. EPA*, tests EPA’s authority to use the Endangerment Finding and the determination that GHGs from new motor vehicles must be regulated to protect public health and welfare as the basis to require PSD permits for new major sources of GHGs and major modifications to existing major sources of GHGs. Although this appeal will likely not directly address the regulations EPA is developing under Section 111 of the Clean Air Act, the real possibility that EPA’s regulation of GHG emissions under the PSD permitting program may be struck down by the Supreme Court underscores the importance of Congressional guidance in this area.

While the current low price of natural gas has contributed to the decline in coal-fired electricity generation and the resurgence of natural gas-fired units, EPA’s new regulations are an equally important factor in this trend. In recent years electric utilities have faced a daunting array of environmental regulations on all fronts – air, water, and waste – that have contributed to widespread unit retirements. According to the American Coalition for Clean Coal Electricity, EPA’s rules have contributed to the closure of some 300 existing coal-fired units in 33 states.

Coal-fired generation is essential to ensure energy diversity and to keep electricity prices low. Although natural gas prices are currently low, recent data from the United States Energy Information Administration (“EIA”) shows that natural gas prices have increased by more than 50% since April 2012. EIA’s Annual Energy Outlook for 2013 projects that natural gas prices for the electric power sector will continue to increase by about 3.7% each year until 2040, and that total electricity demand will increase by 28% by 2040.¹ These estimates underscore the need for a diverse fuel mix that includes coal to meet these energy demands.

In addition to the realities and risks of rising natural gas prices, it is simply not feasible for the nation’s entire existing coal-fired generating capacity to be transitioned to natural gas. Natural gas generation requires transportation from natural gas wells to power plants via an intricate network of interstate pipelines and compressor stations that allow the gas to be constantly pressurized. These requirements raise not only infrastructure concerns but also safety and national security concerns. If a key compressor station were to fail or be targeted in a terrorist attack, the nation’s electric grid would be placed in jeopardy. When these natural gas supply requirements are contrasted with coal which is plentiful in supply, can be stockpiled at a 30-45 day supply, and can be transported via several different methods without the use of interstate pipelines, it makes no sense to require wholesale conversions from coal-fired generation to natural gas, particularly in areas of the country that are rich in coal resources and are not located in close proximity to natural gas wells.

Further regulations limiting GHG emissions from fossil fuel electric generating units are unnecessary and unreasonable. Coal-fired power plants in the U.S. contribute only approximately 4% to global GHG emissions.² The U.S. power fleet has already reduced CO₂ emissions by 16% below 2005 levels, with CO₂ from coal-fired power plants reduced by almost 25%.³ These reductions are a result of the utility sector’s shift to natural gas generation. EPA should allow coal-fired power plants to continue to make these reductions in a reasonable manner and in response to market pressures, instead of by regulatory fiat. Furthermore, the regulations at issue will not have a meaningful impact on global climate change. The minimal impact that these regulations will have on the environment further underscores the need for all GHG regulations to be economically achievable. Currently, EPA is developing GHG regulations for new and existing power plants without adequate input from coal states. None of EPA’s listening sessions are located in Kentucky or any other coal state. Congressional action is necessary to keep EPA from regulating all coal-fired electricity generation out of existence.

C. The Whitfield-Manchin Discussion Draft Bill

EKPC supports the bipartisan Whitfield-Manchin discussion draft bill as common-sense legislation that provides important guidelines and parameters for EPA to follow in developing GHG regulations for new and existing power plants without causing irreparable harm to the U.S. economy. The Whitfield-Manchin discussion draft is different from many of the other bills and

¹ EIA, *Annual Energy Outlook 2013*, April 2013, <http://www.eia.gov/forecasts/aeo/>.

EPA *Greenhouse Gas Reporting Program Data*, available at <http://epa.gov/ghgreporting/ghgdata/reported/powerplants.html> and Ecofys, *World GHG Emissions Flow Chart 2010*, available at <http://www.ecofys.com/files/files/asn-ecofys-2013-world-ghg-emissions-flow-chart-2010.pdf>.

³ EIA, *Monthly Energy Review*, October 2013.

legislative riders that have been introduced in recent years, in that it does not seek to strip EPA entirely of its authority to regulate GHGs under the Clean Air Act. It narrowly responds to only one regulatory initiative by EPA – EPA’s proposed regulation of GHG emissions from power plants under Section 111 of the Clean Air Act. This bipartisan bill is badly needed to ensure EPA does not promulgate a rule that jeopardizes the country’s energy future, puts electricity reliability at risk, and severely harms the economy.

Although EPA’s re-proposed GHG NSPS rule purportedly addressed many of the concerns raised in comments to the 2012 proposal, there are still many troubling aspects of the rule that require Congressional action. First, the proposed rule assumes that no new traditional coal-fired units will be built in the future and considers only IGCC and synfuel units in the rule’s Best System of Emission Reduction (BSER) analysis for new coal-based unit CO₂ limits. Second, the proposed rule eliminated the 30-year compliance option that would have allowed utilities time to phase in use of carbon capture and storage (CCS). Instead, at least partial CCS is required to be implemented in new coal-fired power plants if new coal units are to achieve the BSER CO₂ limits. EPA identifies CCS projects that are currently being developed as evidence that CCS technology has been adequately demonstrated. However, none of the U.S. projects involve traditional coal units. Three of those projects are IGCC facilities that can more readily sequester CO₂ than conventional coal-fired power plants, and one project is a demonstration project at the Boundary Dam power station in Saskatchewan, Canada. In addition, EPA points to the Great Plains Synfuels project and a pilot CCS project that was operated at American Electric Power’s Mountaineer Station in 2009 but subsequently cancelled, as examples of projects that have successfully implemented CCS. None of the generation projects are complete or currently operational and the synfuels project should not be used as a comparison for the electric generation industry.

All of the four CCS projects identified by EPA as currently under development⁴ have received government funding. The Kemper IGCC project, which received a \$270 million federal grant and \$412 million in federal tax credits, recently announced that it will miss its May 2014 completion deadline. Delays at the Kemper IGCC project have contributed to an almost \$5 billion cost that is almost double the original estimated cost of around \$2.8 billion.⁵ In addition, the Boundary Dam project recently announced a \$115 million cost overrun despite receiving \$240 million in funding from the Canadian government.⁶ All of the four projects plan to sell captured CO₂ for enhanced oil recovery. EPA has not considered the taxpayer-funded portion of these project costs and does not appear to have accounted for cost overruns in its BSER analysis.

Any GHG emissions limit under Section 111 must reflect “the application of the best system of emission reduction which ... the Administrator determines has been adequately demonstrated.” EPA has not presented any real evidence that CCS is adequately demonstrated. EKPC supports

⁴ EPA identified Southern Company’s Kemper County Energy Facility, SaskPower’s Boundary Dam CCS Project, Summit Power Group’s Texas Clean Energy Project (recipient of a \$450 million federal grant), and Hydrogen Energy California, LLC’s proposed IGCC facility (recipient of a \$408 million federal grant).

⁵ Associated Press, *Kemper County power project cost approaches \$5 billion with latest rise* (updated Oct. 29, 2013 at 10:19 pm), <http://blog.gulfive.com/mississippi-press-business/2013/10/kemper-county-power-project-co.html>.

⁶ Bruce Johnstone, *SaskPower CEO says ICCS project \$115M over budget*, Regina Leader-Post (Oct. 18, 2013), <http://www.leaderpost.com/business/energy/SaskPower+says+ICCS+project+115M+over+budget/9055206/story.html>.

the language in the draft bill that would prevent EPA from imposing any GHG emission standard on new coal-fired units until such limit has been achieved by representative coal-fired units for at least a year, because EPA's determination that CCS has been adequately demonstrated does not reflect reality.

EKPC's greatest concern relates to regulations for existing sources. As stated earlier, EKPC operates three baseload power plants fueled by coal and one plant operated by natural gas-fired combustion turbines. Pursuant to a consent decree with EPA, EKPC has invested almost \$1 billion in retrofitting existing coal-fired power plants with modern air pollution control equipment. Further, EKPC spent another \$1 billion to construct two of the cleanest coal units in the country. An existing source rule that requires CCS would leave EKPC with no choice but to convert these units to natural gas, essentially wasting the extensive capital investments that have been made to lower pollutants from the coal-fired units. This would result because there is no demonstrated technology that would be able to control GHG emissions. In addition, EKPC has already expended all of its investment capital on pollution controls under the consent decree and has no additional funds to invest in new, expensive technologies such as CCS. The costs associated with such a transition would represent a devastating and unfair impact to our rural members who have already paid for pollution control upgrades to EKPC's existing generating units, only to deal with much higher electricity rates. Higher electricity rates would further harm Kentucky's economy, where coal production has decreased by 64% since 2000. Recent coal mining employment figures released by the Kentucky Energy and Environment Cabinet show only an estimated 12,342 individuals employed in Kentucky coal mines – the lowest level recorded since 1927 when the Commonwealth began keeping mining employment statistics.⁷ With higher rates, manufacturing jobs would also disappear, further compounding the impact to the economy from the loss of mining jobs. These dire figures demonstrate that Congressional action is sorely needed to ensure that coal-fired generation can continue in states like Kentucky.

These concerns extend to Governor Beshear's Kentucky Climate Action Plan which proposes significant GHG emissions reductions from the electric generating sector beginning in 2020. Reductions at this level will result in the shutdown of EKPC's coal units for which hundreds of millions dollars have been spent on pollution controls to ensure that the units could comply with EPA's many new environmental regulations. EKPC, instead, favors an approach like the one that the Whitfield-Manchin discussion draft bill contemplates, which we believe will foster more flexible, creative approaches to reducing GHGs from new and existing sources.

Even if we ignore the economic devastation that will result from an adverse existing source rule, Congressional action is also necessary to prevent Section 111(d) from being used to regulate GHG emissions from existing power plants. It is EKPC's view that the discussion draft bill does not go far enough, since the bill seems to assume that Section 111(d) is an appropriate vehicle for regulating GHG emissions from existing stationary sources. The discussion draft bill requires only that Congress set an effective date for any standard of performance for existing sources under Section 111(d) and that such rules or guidelines may not take effect unless the Administrator has submitted to Congress a report containing:

⁷ Kentucky Energy and Environment Cabinet, *Kentucky Quarterly Coal Report*, Q2 2013, [http://energy.ky.gov/Coal%20Facts%20Library/Kentucky%20Quarterly%20Coal%20Report%20\(Q2-2013\).pdf](http://energy.ky.gov/Coal%20Facts%20Library/Kentucky%20Quarterly%20Coal%20Report%20(Q2-2013).pdf)

- (1) the text of such rule or guidelines;
- (2) the economic impacts of such rule or guidelines, including potential effects on economic growth, competitiveness and jobs, and on electricity ratepayers; and
- (3) the amount of GHG emissions that such rule or guidelines are projected to reduce as compared to overall GHG emissions.

While this may have the result of delaying indefinitely any regulations that EPA may promulgate under Section 111(d), EKPC supports a more permanent solution that clarifies that Section 111(d) cannot be used to regulate GHG emissions from existing power plants. Regardless of whether the utility sector may eventually succeed in challenging these regulations, Congress should put an end to the regulatory uncertainty surrounding existing power plants and clarify that Section 111(d) and, in fact, Section 111 as a whole, is not the appropriate mechanism for regulating GHG emissions from electric generating units.

C. Conclusion

EKPC appreciates the work of this Committee and the opportunity to present our views on EPA's regulation of GHGs from power plants. To summarize, EKPC's main concern is for our rural cooperative members. There is a lack of technology that would allow EKPC to control GHG emissions, and a lack of demonstrated benefits to the environment. Most if not all coal-fired units will be forced to retire as a result of the regulation of GHG emissions, which would astronomically increase electricity rates and ultimately cause further job losses. EKPC believes the transportation and national security concerns presented by natural gas pipelines and compressor stations, as well as the upward trend in natural gas prices make conversion to a gas-fired utility fleet much too risky for this country's energy security. I would like to reaffirm EKPC's support for the Whitfield-Manchin discussion draft bill. Congressional action is sorely needed to end the regulatory uncertainty surrounding the electric power sector and put the country back on a path toward full economic recovery.

Mr. WHITFIELD. Thank you very much.
And, Ms. Tierney, you are recognized for 5 minutes.

STATEMENT OF SUSAN F. TIERNEY

Ms. TIERNEY. Thank you, Mr. Chairman. Representative McNerney, and members of the subcommittee, I appreciate the chance to be here. I understand the premise for the bill you are considering today is a concern that the EPA's actions will have the effect of barring the ability of coal in new power plants and existing power plants, and will have a negative impact on electricity consumers and the economy.

In light of the market realities that we are experiencing in the United States today and ahead, I think this concern is misplaced for several reasons. First, various abundant domestic energy resources are competing to supply affordable, reliable, and clean electricity supply. That is happening now, and it is good for Americans.

Second, EPA's taking action under Section 111 will help to clarify the rules of the road under which coal and natural gas will compete with each other, and with other power supplies and technologies in the future. Having clear rules and regulatory stability will help a positive investment environment at a time when the nation stands to spend up to a trillion dollars on new generating capacity in parts of the country.

Third, putting the rules in place will help EPA address pollutants that have been found to threaten public health, and the welfare of current and future generations, and they will allow a pathway for coal and natural gas to be part of our vibrant energy supply. EPA's action under Section 111 is important for public health, and is consistent with domestic energy resource development and use as part of a reliable, affordable, competitive clean energy supply, and there are several reasons why I reached that opinion.

First, coal has been the dominant fuel, and remains the dominant fuel, used to generate electricity in the United States in no small part because of its affordability in its price. Second, the level of coal used has varied dramatically over the years as new developments in technologies and fuel developments in prices have brought about changes in the supply mix, including nuclear power, renewable energy, and much more natural gas.

Until recently, these economic conditions greatly favored the use of coal, but the shale gas revolution has fundamentally changed that situation. This other abundant domestic supply is now economically accessible, can supply 100 years at today's levels of consumption, and it can play an important role in helping the U.S. reduce greenhouse gas emissions from power supply. Abundant domestic supply of renewable energy also can supply these outcomes.

Currently, low gas prices are putting economic pressure on coal facilities. We see the forward natural gas prices continuing to make it attractive to invest in natural gas, as compared to coal-fired generator facilities. This economic pressure is lowering, not raising, electricity prices, and has been the case around the country, and there is more market pressure on coal as a result of that. This has contributed to the announcements of retirements of some of the oldest and least efficient coal-fired generating units, and the economics of over 100 power plants that had been proposed to be built

on coal have been gradually cancelled because of those poor economic alternatives. Today the fuel of choice is natural gas for power generation, as well as renewable power projects. And, as we have heard today, it is away from coal.

The bottom line for electricity market fundamentals is that coal and natural gas are in strong competition, will remain so. They were at head to head to competition, in terms of market shares, a year ago, in 2012, and coal has regained a small portion of the competitive share that gas had taken away. These market dynamics have been important for helping the United States and the electric industry provide power reliably and affordably to consumers at low prices, and that will continue. They are affording the U.S. the opportunity to diversify, not otherwise, its overall mix of supplies.

The industry's responses to the EPA regulations will stimulate much needed economic activity and modernization of the electric system. Again, the investors in this industry need certainty, and the EPA greenhouse gas rules are providing that, in light of the fact that they have been expected for many years, and are on their way. The recent changes in coal use have taken place at a time when production has remained relatively strong, in large part because of the export growth that we have seen.

And, finally, let me just summarize by saying that the EPA's 111 regulations for new and existing power plants will allow flexibility, and pathways for coal and gas to play an important role going forward in our electricity supply.

Thank you.

[The prepared statement of Ms. Tierney follows:]

Testimony of Susan F. Tierney, Ph.D.
Before the U.S. House of Representatives
Committee on Energy and Commerce, Subcommittee on Energy and Power
Hearing on EPA's Proposed GHG Standards for New Power Plants and
H.R. ___, Whitfield-Manchin Legislation
November 14, 2013

Summary of Testimony

Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee. My testimony focuses on the context for the Congressional consideration of the Whitfield-Manchin bill. If enacted, the bill would limit the ability of the U.S. EPA, under the Clean Air Act (Section 111), to adopt regulations addressing GHG emissions from new power plants and to issue guidance for regulating GHG from existing power plants.

I understand that the premise for the bill is a concern that the EPA's actions will have the effect of barring the ability to burn coal in new power plants and will have a negative impact on electricity consumers, the economy and the coal industry. In light of market realities affecting the nation's power system, I think that this concern is misplaced, for several reasons.

First, various abundant domestic energy resources are competing to supply affordable, reliable and clean electricity supply to consumers. This is beneficial for American consumers and for the economy. Second, EPA's taking action under Section 111 will help to clarify the 'rules of the road' under which coal and natural gas will compete with each other and with other fuels/technologies in the future. Having clear rules and regulatory stability will help support a positive investment environment at a time when new capacity and investor support for billions of financing will be needed to be added in many parts of the country. Third, putting the rules in place will allow EPA to address pollutants that have been found to threaten public health and the welfare of current and future generations of Americans, and to do so in a sector that produces one third of total GHG emissions in the U.S. The EPA's regulations will allow paths for the continued use of coal (and natural gas) as part of the nation's energy supply.

EPA action under Section 111 of the CAA is important for public health and is consistent with the goals for domestic energy resource development and use as part of a reliable, affordable, competitive and clean energy supply. My opinion is grounded in several facts and conditions in energy markets:

- Coal has been the dominant fuel used to generate electricity in the U.S., in no small part due to the nation's abundant supply of coal, and its historically low production costs.
- The level of coal use for power production has changed over the years, along with developments in new power generating technologies, changes in the cost to build different types of plants, and changes in the relative prices of fuels.
- Until recently those economics greatly favored use of coal. But the recent shale gas revolution has fundamentally changed that situation. This other abundant domestic fossil fuel is now economically accessible, can also supply over 100 years of demand at today's consumption rates, and can play an important role in helping the U.S. reduce GHG emissions from power supply. Abundant domestic supply of renewable energy (with zero fuel costs) also enable such outcomes.
- Currently low gas prices are putting economic pressure on coal facilities in most parts of the U.S. Gas-fired generation has increased, while coal-fired generation has decreased. Low prices in

forward natural gas markets has caused natural gas to become a better value, when compared to the cost of electricity generation at many coal-fired power plants.

- This in turn has led to lower wholesale electricity prices, which has in turn put significant market pressure on use of coal for power generation at many existing plants and new ones. It has contributed to announcements of retirements for some of the oldest, smallest and least-efficient coal plants. And the economics of over a hundred proposed new coal-fired power plants gradually became less attractive, leading to cancellations of projects.
- The “fuel of choice” for new power generation capacity planned and under construction by electric utilities and independent power producers has shifted to natural gas and renewable power plants, and away from coal.
- The bottom line of electricity market fundamentals is that coal and natural gas are in strong competition for market share. Such inter-fuel competition is not new in the power industry.
- These market dynamics have been important for helping the electric industry provide power to consumers (and to the U.S. economy) at relatively low prices in the past few years. These developments have also afforded the U.S. with the opportunity to simultaneously diversify its overall mix of power supplies using domestic energy resources.
- The industry’s responses to the EPA regulations and market conditions – in the form of investments in environmental control technologies, new power plants, and other responses – will stimulate much-needed economic activity and modernization of the electric system. Investors in the nation’s power sector need regulatory certainty, especially at a time when the industry is poised to spend an estimated billion dollars on power generation in upcoming years. The EPA GHG rules for power plants have been expected for many years.
- The recent changes in coal’s use in power generation have taken place during a period in which U.S. domestic production of fossil fuels has remained relatively strong in part due to increased exports of coal in recent years.

The nation’s various abundant domestic energy resources are competing to supply affordable, reliable and clean electricity supply to consumers. This is beneficial for American consumers and for the U.S. economy, and EPA’s actions under Section 111 will not adversely undermine the ability of the nation to rely on domestic resources for power generation.

Testimony of Susan F. Tierney, Ph.D.

**Before the U.S. House of Representatives
Committee on Energy and Commerce, Subcommittee on Energy and Power**

**Hearing on EPA's Proposed GHG Standards for New Power Plants and
H.R. 2 Whitfield-Manchin Legislation
November 14, 2013**

Summary of Testimony

Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee.

My name is Susan Tierney, and I am a Managing Principal at Analysis Group, Inc., a 650-person economic consulting firm headquartered in Boston, Massachusetts.¹

I appreciate the opportunity to testify today and to provide information on the context for the Congressional consideration of the Whitfield-Manchin bill. If enacted, this bill would limit the ability of the U.S. Environmental Protection Agency ("EPA") under Section 111 of the Clean Air Act ("CAA") to adopt regulations addressing greenhouse gas ("GHG") emissions from new power plants and to issue guidance for state plans to reduce GHG emissions from existing power plants.

I understand that the premise for the bill is a concern that the EPA's actions under Section 111 will have the effect of barring the ability to burn coal in new power plants and will have a negative impact on electricity consumers, the economy and the coal industry. In light of market realities affecting the nation's power system, I think that this concern is misplaced, for several reasons.

¹ As indicated on my "Truth in Testimony" form, I am testifying on my own behalf, and neither on behalf of a governmental entity nor a non-governmental entity (other than myself). I have not received a federal grant (or subgrant) or contract (or subcontract) during the current fiscal year or either of the two preceding fiscal years.

Testimony of Susan F. Tierney
 Before the House Energy and Commerce Committee, Subcommittee on Energy and Power
 Hearing on Whitfield-Machin bill (EPA action on GHG emissions from new and existing power plants)

November 14, 2013

- First, various abundant and domestic energy resources are competing to supply affordable, reliable and clean electricity supply to consumers. This is beneficial for American consumers and for the economy.
- Second, EPA's taking action under Section 111 will help to clarify the 'rules of the road' under which coal and natural gas will compete with each other and with other fuels and technologies in the future. Having clear rules and policy stability will help support a positive investment environment at a time when new generating capacity and investor support for billions in financing will be needed in many parts of the country
- Third, putting the rules in place will allow EPA to address pollutants that have been found to threaten public health and the welfare of current and future generations of Americans, and to do so in a sector that produces one third of total GHG emissions in the U.S. The EPA's regulations will allow paths for the continued use of coal (and natural gas) as part of the nation's electric energy supply.

My opinions are grounded in several facts and conditions in energy markets, which I explain further in my testimony below.

EPA action under Section 111 is important from a public health point of view, and is consistent with the goals for domestic energy resource development and use as part of a reliable, affordable, competitive and clean energy supply. Based on my nearly three decades of public and private-sector experience in electric system economics, policy and regulation, I think that Americans and the U.S. economy will benefit from EPA having the opportunity to take action as now directed under Section 111. My opinions stem from my knowledge of competitive power markets, fuel

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markets (including natural gas and coal), the processes for permitting, developing and financing new energy facilities, and the diversity of ways that the electric industry provides reliable, efficient and clean electricity to consumers.² I respectfully urge you not to approve the Whitfield-Machin bill.

² As indicated in my attached CV, I have been involved in issues related to public utilities, ratemaking and electric industry regulation, and energy and environmental economics and policy for over 25 years. During this period, I have worked on electric and gas industry issues as a utility regulator and energy/environmental policy maker, consultant, academic, and expert witness. I have been a consultant and advisor to private energy companies, grid operators, government agencies, large and small energy consumers, environmental organizations, foundations, Indian tribes, and other organizations on a variety of economic and policy issues in the energy sector. Before becoming a consultant, I held several senior governmental policy positions in state and federal government, having been appointed by elected executives from both political parties. I served as the Assistant Secretary for Policy at the U.S. Department of Energy from early 1993 through summer 1995. I held senior positions in the Massachusetts state government as Secretary of Environmental Affairs; Commissioner of the Department of Public Utilities; and Executive Director of the Energy Facilities Siting Council. My Ph.D. in regional planning is from Cornell University. I previously taught at the University of California at Irvine, and recently at the MIT. I currently sit on several non-profit boards and commissions, including as chair of the Advisory Council of the National Renewable Energy Laboratory; chair of ClimateWorks Foundation; a director of World Resources Institute, the Energy Foundation, and the Alliance to Save Energy; and a member of the Bipartisan Policy Center's energy project, of the National Petroleum Council, and of the NYISO's Environmental Advisory Council; and as co-lead convening author of the Energy Supply and Use chapter of the National Climate Assessment. I recently served on the Secretary of Energy's Advisory Board, where I was a member of its Shale Gas Production Subcommittee; and chaired the Policy Subgroup of the National Petroleum Council's study of the North American natural gas and oil resource base. Previously, I served as co-chair of the National Commission on Energy Policy; a representative to committees of the North American Electric Reliability Council; and a member of the National Academy of Sciences' Committee on Enhancing the Robustness and Resilience of Electrical Transmission and Distribution in the United States to Terrorist Attack. I have participated in countless studies, blue-ribbon commissions and other relevant analyses over my career. I have been invited to speak on U.S. electricity and energy markets at conferences sponsored by the National Association of Regulatory Utility Commissioners, the Bipartisan Policy Center, the Massachusetts Institute of Technology, the National Association of Clean Air Agencies, the National Governors Association, the Keystone Board, various universities (Harvard, Northwestern, MIT, Yale, University of Michigan, Boston University, University of Rochester, University of Colorado at Boulder, Wharton, Tufts, and others), and other organizations.

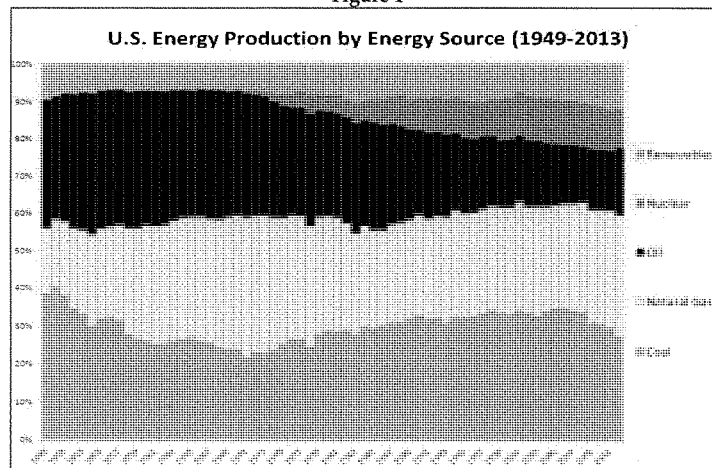
1. The U.S. has many abundant and diverse domestic energy resources that are competing actively to provide electric power generation

Today's electricity market is becoming more diverse as it also becomes more efficient, more affordable and cleaner. The backdrop for this positive outlook for the nation's electric resource mix is a history with much less diversity and with periodic concerns about energy security.

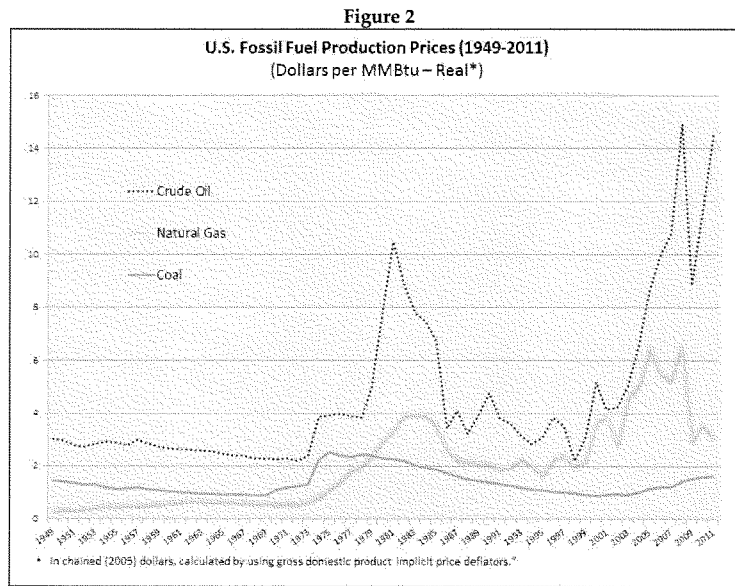
a. Coal has been the dominant fuel used to generate electricity in the U.S.

For my entire lifetime, coal has been the dominant fuel used to generate electricity in the U.S. Coal has also been a steady feature of overall U.S. energy supply, with coal production exceeding both natural gas and crude oil production in the U.S. for over half of the last sixty years (including the period from 1984 through 2010), as shown in Figure 1. This resulted in no small part from the nation's abundant coal resource base, as well as the relatively low domestic production prices compared to natural gas and crude oil, as shown in Figure 2.

Figure 1



Source: Energy Information Administration ("EIA"), "Annual Review of Energy"



Source: EIA, "Annual Review of Energy"

b. The level of coal use for power production has changed over the years

The overall level of coal used in the U.S. for power generation has varied over time, in large part with the advent of new power generation technologies (including nuclear energy, combined-cycle natural-gas technology, advanced coal generating technologies, wind, solar), and changes in cost to develop/construct/finance/operate different types of plants. Coal's relative attractiveness for power production has also been greatly affected by fuel prices and changes in cost to deliver fuel to power plants. In turn, major changes in federal energy, environmental and economic law and

policy (among others), and many other changes in state statutes and regulation, have affected the relative roles that different fuels and technologies have played at different points in U.S. history.

Figure 3 shows the overall percentage of power generated by different fuels, from 1949-2013, along with significant changes in relevant federal laws. Development of federal hydroelectric projects during the New Deal's rural electrification period led to substantial reliance on water as the second largest source of energy for electricity (with coal as the first largest source). Nuclear power entered the market several decades after 1950s-era federal laws supported commercialization of the atom and investment in nuclear plants.³ After price spikes following the OPEC oil embargo in 1973, Congress adopted laws limiting oil and natural gas for power generation, and coal regained market share for many years.⁴ Natural gas began to rebuild its role after federal laws supporting deregulation improved supplies and lowered prices of gas, and its relatively clean-burning profile gave it certain advantages for new power plant permitting in many parts of the country, once the CAA was passed in 1990.⁵ Gas got another boost after around 2000, as competition in the wholesale power markets⁶ and electric industry restructuring in many states led to development of a significant amount of new gas-fired capacity. Nevertheless, the fact that existing-coal-fired power plants were grandfathered for many years under sections of the CAA also contributed to coal's ability to continue to play a significant role in producing electricity, even as natural gas and renewables have gained market shares.

³ For example, through the Atomic Energy Act of 1954, with the Price Anderson Act in 1957.

⁴ The Fuel Use Act was enacted in 1978, but was later repealed in 1987.

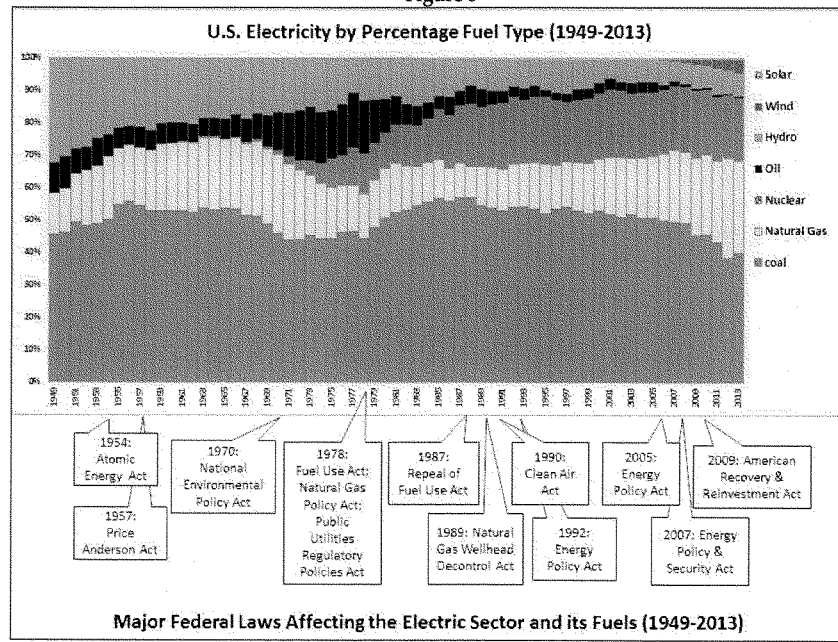
⁵ See the 1978 Natural Gas Policy Act, the 1989 Natural Gas Wellhead Decontrol Act.

⁶ See the Energy Policy Act of 1992 and the Energy Policy Act of 2005.

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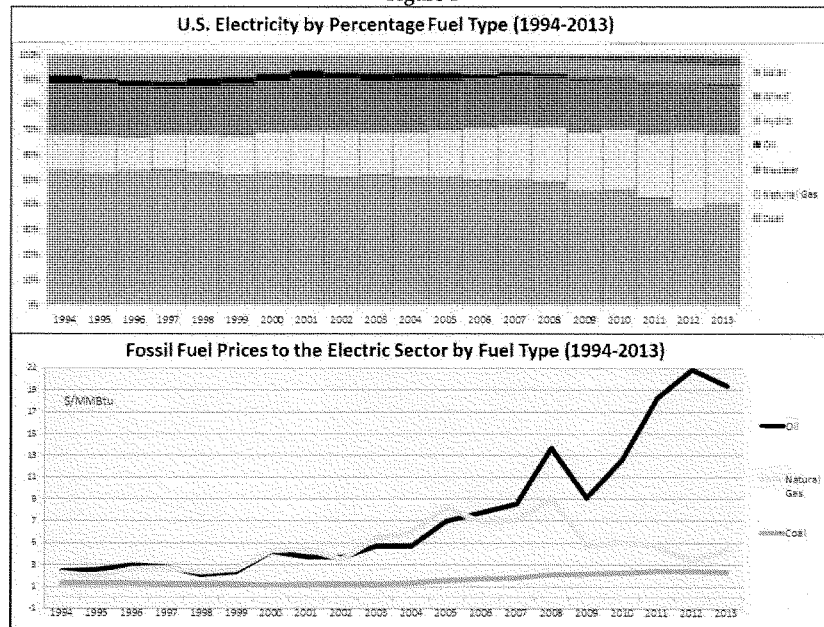
Figure 3



Power generation shares (by fuel) also depend significantly on the cost of fuels as they have changed over time, in absolute terms and in relationship to each other. Figure 4 shows the same generation-by-fuel information as displayed in Figure 3 for the years 1994-2013, but also includes information about the changes in prices of coal, natural gas and oil fuels.⁷

⁷ These are displayed on a comparable dollar-per-MMBtu of energy basis.

Figure 4



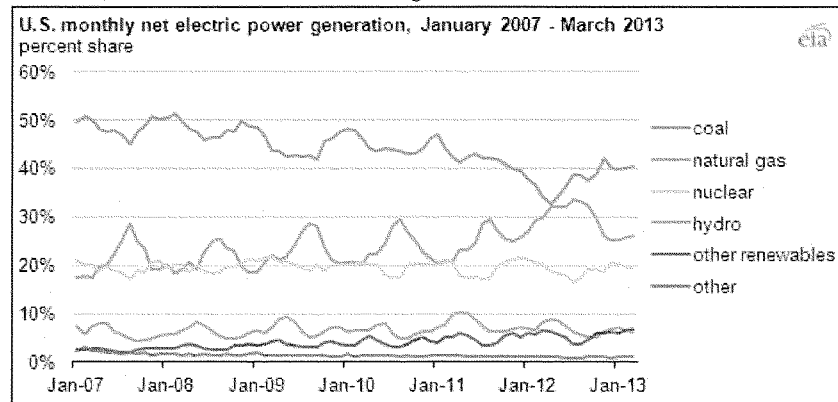
Source of data on electricity: U.S. EIA, "Annual Review of Energy"

- c. *Until recently those economics greatly favored use of coal, but the recent shale gas revolution has fundamentally changed that situation.*

Even as coal use has changed over the years, it has still played the dominant role in producing electricity for over six decades. It was not until recent developments in natural gas drilling and production technologies spurred the "revolution" in domestic supplies of natural gas, that coal experienced close to equal power-production market shares with another fuel (when that occurred

for a single month, in April 2012, as shown in Figure 5).⁸ Indeed, even with such recent head-to-head competition with natural gas, coal has persisted as a large player in the U.S. power market.

Figure 5



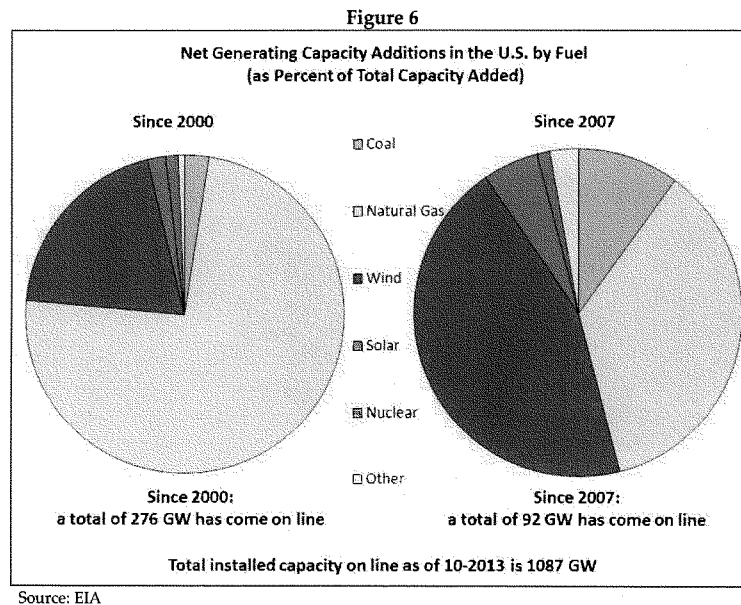
Source: EIA, Today in Energy, May 23, 2013

The currently low natural gas prices are putting economic pressure on coal facilities in most parts of the U.S. Even taking into account the effects of the economic downturn on power plant output (and electricity demand) that begin in 2008, lower gas natural gas prices and higher coal prices to utilities and independent power producers (as shown in Figure 6, below) have meant that gas-fired power plants increased their output (from 20 percent of all power production in the U.S. in 2007, to 28 percent to date in 2013), while coal-fired generation decreased (from 50 percent in 2007 to 39

⁸ "After an equal share of electric power was generated from coal and natural gas in April 2012, EIA's most recent preliminary data through March 2013 show coal has generated 40% or more of the nation's electricity each month since November 2012, with natural gas fueling about 25% of generation during the same period." Source: EIA, Today in Energy May 23, 2013: "Coal regains some electric generation market share from natural gas," <http://www.eia.gov/todayinenergy/detail.cfm?id=11391>

percent 2013 (through September).⁹ Gas-fired generation increased in absolute terms, while coal-fired generation decreased in absolute levels over that period.¹⁰

These changes in power generation were able to occur relatively rapidly in light of the significant amount of gas-fired generating capacity that had been added in the U.S. since 2000 (as shown in Figure 6). That boom in construction ended up with capacity surplus in many regions for many years, and with under-utilized gas-fired capacity when natural gas prices rose.



⁹ Source: EIA, Monthly Energy Review, and Short-Term Energy Outlook.

¹⁰ Coal-fired generation dropped from 2016.5 GWh in 2007 to 1517.2 GWh in 2012, while generation at plants burning natural gas increased from 896.6 GWh in 2007 to 1230.7 GWh in 2012. Source: EIA, Monthly Energy Review, October 2013, Table 7.2a.

The trend towards increased natural gas use (and displacement of some coal-fired generation) was greatly influenced by the structural changes in U.S. natural gas development.¹¹ Starting in mid-2007, many observers of natural gas markets began to expect more stable and lower natural gas prices in the future. This came from a growing expectation that unconventional gas wells in the U.S. – including shale gas in particular – could be reached more economically through new applications of technologies, including directional (horizontal) drilling and hydraulic fracturing. Consistent with this view and after a period of relatively flat assessments, the estimates of technically recoverable gas reserves increased, as various experts began to calculate the resources in underground areas that could now be reached with known technologies.¹² The National Petroleum Council's 2011 report characterized this "shale gas revolution" this way:

Natural gas is a very abundant resource. America's natural gas resource base is enormous. It offers significant, potentially transformative benefits for the U.S. economy, energy security, and the environment. Thanks to the advances in the application of technology pioneered in the United States and Canada, North America has a large, economically accessible natural gas resource base that includes significant sources of unconventional gas such as shale gas. This resource base could supply over 100 years of demand at today's consumption rates. Natural gas, properly produced and delivered, can play an important role in helping the United States reduce its carbon and other emissions.¹³

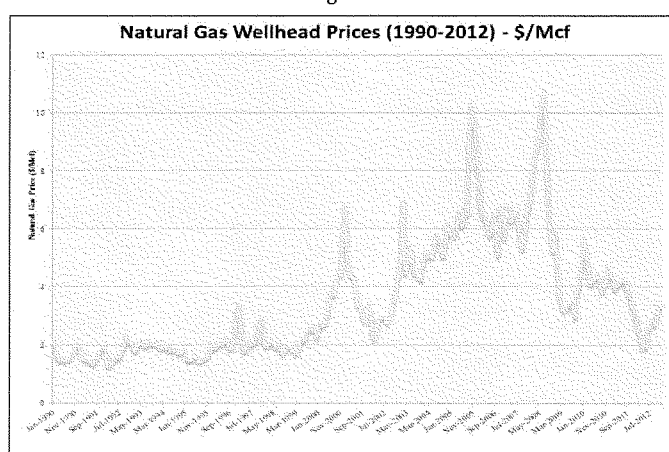
¹¹ See, for example, National Petroleum Council, "Prudent Development: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources" ("NPC Report"), September 2011.

¹² Revised estimates and outlooks for natural gas have come from the Potential Gas Committee, the U.S. Geological Service, the U.S. Department of Energy, the EIA, and the National Petroleum Council, among many others.

¹³ NPC Report", page Executive Summary 8.

These changes, in combination with the lower demand for energy (from the U.S. economic downturn starting in the second half of 2008 and other factors¹⁴), resulted in more stable and lower natural gas prices in U.S. energy markets, as shown in Figure 7 for wellhead prices of natural gas.¹⁵

Figure 7



Prices in forward natural gas markets (i.e., future prices for natural gas commodities that could be locked in prior of delivery dates for the underlying natural gas) also began to drop during this period, illustrating the market's expectations that prices would continue to reflect the larger (and increasing) supplies of natural gas. Figure 8 shows forward prices for natural gas.¹⁶ Lower prices

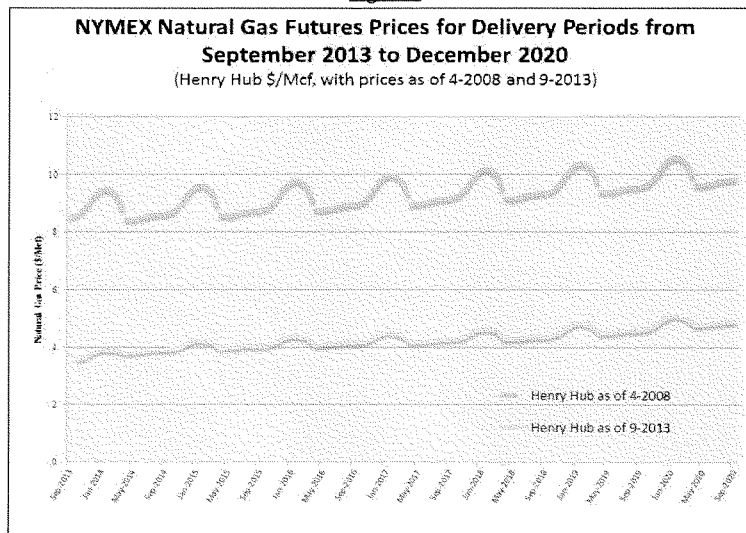
¹⁴ Including states' promotion of increased funding for energy efficiency programs, and stronger appliance energy efficiency standards.

¹⁵ Wellhead prices do not include the cost to process and deliver gas to areas of use, such as in Colorado markets, but nonetheless show the changes in average production costs for natural gas over the time period shown.

¹⁶ Note that these forward gas market prices indicate seasonal variation in prices, with prices in winter months rising as demand for gas increases with uses of gas for heating purposes. The overall year-to-year trends indicate an expectation of gradually rising prices for natural gas.

in forward natural gas markets caused natural gas to become a relatively better value, when compared to the cost of coal for use in electricity generation.¹⁷

Figure 8



Note that my focus on the size and implications of the large resource bases for natural gas (and coal) are not meant to divert attention to the contributions of other domestic energy resources which are also substantial and rich. Some of these (such as crude oil) are not expected to play a large role in the power sector going forward. Others, however, including the nation's vast wind and solar resources, are expected to continue to increase the market share that they have begun to gain in the past decade, in part due to their support in states with renewable portfolio standards, in

¹⁷ National Petroleum Council, "Prudent Development: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources," September 2011.

part due to their having virtually free fuel, and in part due to their virtually carbon-free generating profile.

d. Currently low gas prices are putting economic pressure on coal facilities and coal project proposals in most parts of the U.S.

Lower natural gas prices have reduced fuel costs for power plant operators, which in turn has led to lower electricity prices in recent years and significant market pressure on use of coal for power generation at existing plants and new ones, as well. There are several ways that has played out.

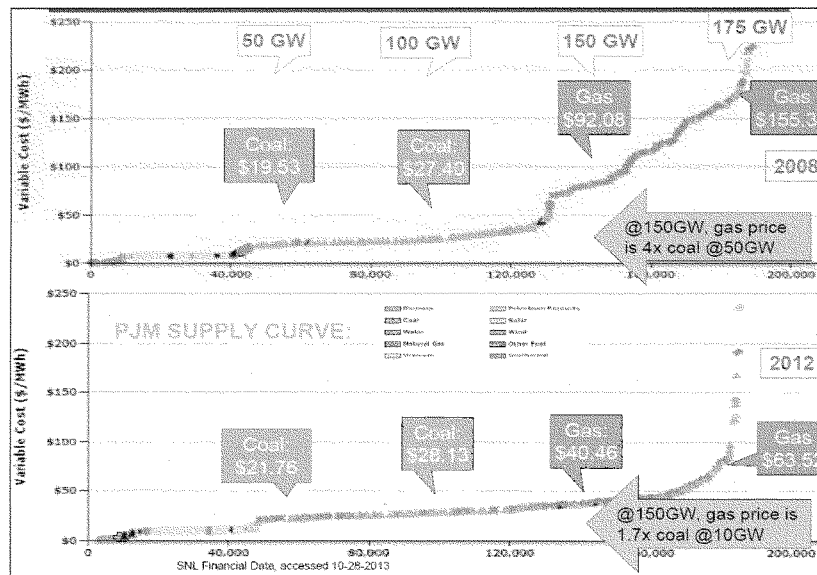
First, to see the effect of such low-natural-gas prices on spot prices for electricity and on price pressure on existing coal plants, Figure 9 shows the power production supply curves for the PJM power region of the U.S. PJM serves portions of states in the Mid-Atlantic and Midwest areas and is the largest centralized regional wholesale power market in the U.S.

Given PJM's wholesale market design, a good proxy for the market clearing price in any hour is the variable operating costs of the marginal generator in that hour. I've shown the variable costs (including fuel) of the marginal generator at different load levels (e.g., 50 GW, 100 GW, 150 GW, and 175 GW) as they were on average in 2008 versus in 2012.

As shown in 2008, the clearing price at a 150-GW load was \$92.08/MWh, based on the variable costs of the marginal generator (a gas plant). The proxy clearing price at a 175-GW load was \$155.37/MWh, again based on a gas-fired power plant. Thus, at the 150-GW point on the supply curve, the average energy clearing price was four times the clearing price at a 50-GW load level, where the marginal supply was a coal plant operating with \$19.53/MWh.

By 2012, things had dramatically changed. The marginal generator at a 150-GW load level was still a gas-fired power plant, but its average variable costs had dropped to \$40.46/MWh; at the 175-GW load level, the proxy clearing price was \$63.52, or a 60-percent reduction in wholesale clearing prices. By contrast, the coal-fired power plants' operating costs had increased in 2012 relative to 2008 (as shown by comparing the marginal plant operating at 50-GW and 100-GW load levels in each year). Most of this change reflected higher coal supply costs in 2012 relative to 2008 – the opposite from what had happened to the fuel costs of natural-gas-fired power plants in PJM.

Figure 9



Source: SNL Financial data on supply curves for PJM.

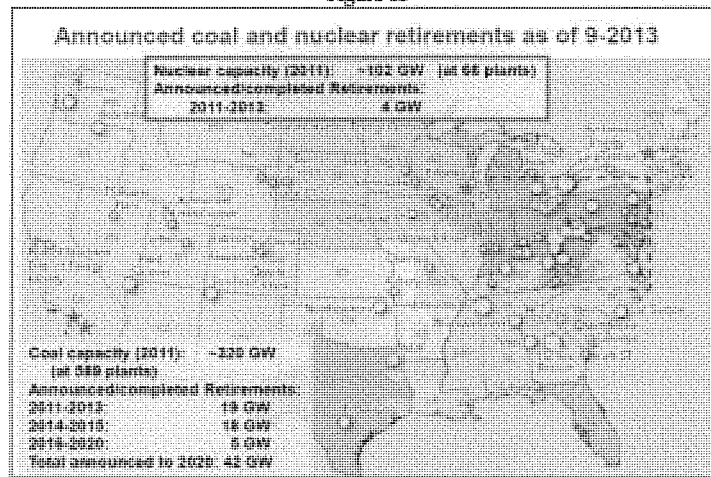
Because in PJM, clearing prices in hourly energy markets are the basis for compensating power plants for providing electricity in that hour, a typical coal plant's costs rose while its payments from the electric energy market decreased. This has created real price pressure on owners of older and less-efficient power plants, not only because of lower revenues but also because they operated (and got paid) less often (while some natural gas plants were dispatched more often, instead of such coal plants).

Second, this market pressure resulting from low natural gas prices led to announcements of retirements of some of the oldest, smallest and least-efficient coal plants. Figure 10 shows the locations and amounts of announcements of coal plants (along with nuclear plants). As of September 2013, the total amount of announced coal-plant retirements was 42 GW (out of a total of 320 GW of coal-fired capacity in 2011). (My longer explanation of such market changes is in my February 2012 paper called "Why Coal Plants Retire: Power Market Fundamentals as of 2012.")

Some, but certainly not all, of the announcement retirements of existing power plants has also been prompted by problems in market rules in some regional markets¹⁸ as well as the upcoming air-pollution-control requirements associated with compliance with EPA's Mercury and Air Toxics Standard ("MATS").

¹⁸ See: my testimony ("Considerations for the Future of Centralized Capacity Markets") before the Federal Energy Regulatory Commission's Technical Conference on Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators, Docket No. AD13-7-000, September 25, 2013; my presentation to the Keystone Energy Board, "The World of Abundant Natural Gas in the U.S.: Looking Ahead for Power-Sector Implications," October 30, 2013; and my presentation to the Independent Power Producers Association of New York, "Capacity Markets in the Northeast," September 10, 2013.

Figure 10



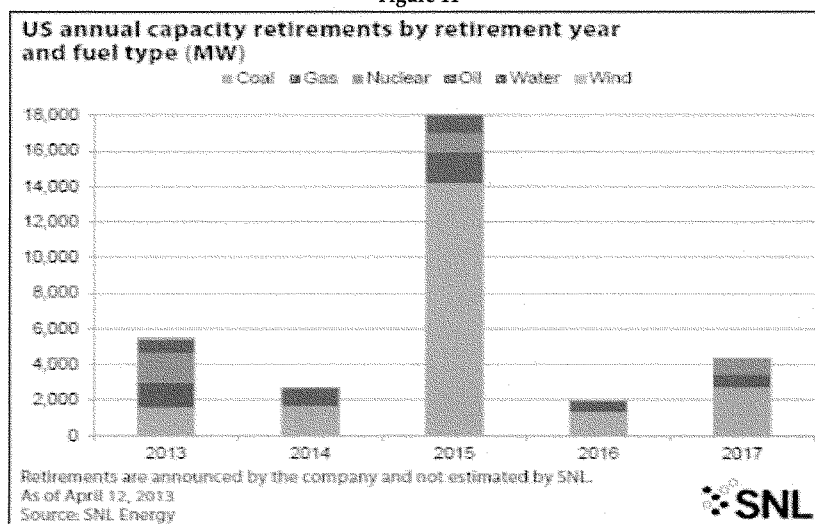
Source: SNL Financial for announced coal plant retirements, with SNL map annotated to include announced retirements of 5 existing nuclear generating units.

The majority of coal-fired generating capacity already complies with such air regulations,¹⁹ and therefore such regulations raise new compliance costs mainly for the coal-fired and oil-fired power plants not yet in compliance. Because owners of plants affected by the MATS rule have until March 2015 at the earliest (and in some cases will have more time) to comply with the rule's requirements, the retirements anticipated to occur before then can be viewed as heavily affected by current power market pressures. In a world of low gas prices, some of the least-efficient coal plants do not have an economic justification to add on equipment or otherwise make expenditures to comply with the MATS rule, and are therefore likely to retire as of the date needed to comply with these health-based environmental standards. Figure 11 indicates announcement power plant

¹⁹ See Michael Bradley, Susan Tierney, Chris Van Atten, and Amlan Saha, "Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability," Summer 2011 Update, June 2011.

retirements by fuel type (including natural gas, nuclear and oil-fired power plants, as well as coal plants) and by year of expected retirement.

Figure 11



Third, the economics of some proposed, new coal-fired power plants gradually became less attractive in recent years, as the outlook for low natural gas prices became more broadly shared by investors. Over 150 planned new coal-fired power plant projects were cancelled from the mid-2000s through early 2013.^{20,21}

²⁰ "Coal Plants Are Victims of Their Own Economics," *Science*, February 18, 2013, accessed on November 3, 2013 at: <http://news.sciencemag.org/2013/02/coal-plants-are-victims-their-own-economics>, reporting on the presentations at a panel held at the annual meeting of the American Association for the Advancement of Science.

²¹ In early 2012, there had been 24.7 GW of specific announced coal plant retirements; by a year and a half later (Q3 2013), that number had increased to 40.8 GW nationally (including plants in Canada that are part of US NERC regions). See National Energy Technology Laboratory ("NETL"), "Tracking New Coal-Fired Power Plants (data update 1/13/2012), January 13, 2012 SNL coal plant retirement data as of October 2013.

- e. *The “fuel of choice” for new power generation capacity planned and under construction by electric utilities and independent power producers has shifted to natural gas and renewable power plants, and away from coal*

Over this period, the “fuel of choice” for new power generation capacity planned and under construction by electric utilities and independent power producers shifted to natural gas and renewable power plants, and away from coal.²² This reflects the changing price outlook for fuels, as well as changes in the capital costs associated with financing and constructing new power plants,²³ state policy support for generating more power from domestic renewable energy resources,²⁴ and other factors (such as investment size and risk).

Figure 12 and Table 1 show the amount of planned generating capacity in the U.S., by fuel type

²² I note, for example, the decision of the Kentucky Public Service Commission to approve a proposal by investor-owned utilities (Kentucky Utilities Co. and Louisville Gas & Electric Co.) to construct a 640-MW combined cycle natural gas-fired generating facility and to purchase an existing 495-MW natural gas-fired peaking plant. The new gas plant is designed to replace coal-fired units that will be retired by 2015 and to meet projected increases in demand for electricity by 2016. “In an order issued today, the PSC agreed...that the companies had proven the need for the replacement generating capacity and demonstrated that the proposed gas-fired plants were the least-cost, reasonable option for providing the needed power.” Kentucky Public Service Commission press release, “PSC Approves LG&E and KU Plan for Gas-fired Power Plants,” May 2, 2012.

²³ See, for example, the estimates of levelized cost of energy prepared by Lazard in different years, with costs of different technologies (e.g., advanced coal, natural-gas combined cycle capacity, on-shore wind, nuclear, solar) shifting from 2009 to 2013. Using an approach it describes as determining the “levelized cost of energy, on a \$/MWh basis, that would provide an after-tax [internal rate of return] to equity holders equal to an assumed cost of equity capital,” Lazard estimated that the levelized cost of energy for most types of power generation technologies dropped from 2009 to 2013. The range of costs of the most-common technologies added in the period since 2007 (i.e., natural gas peaking plants, natural gas combined cycle units, and wind turbines) all declined during this period:

	2009 estimate (\$/MWh)	2013 estimate (\$/MWh)
Natural gas combined cycle	\$74-\$102	\$61-\$87
Conventional coal	\$78-\$144	\$65-\$145
On-shore wind	\$57-\$133	\$45-\$95

“Certain assumptions (e.g., required debt and equity returns, capital structure, and economic life) were identical for all technologies, in order to isolate the effects of key differentiated inputs such as investment costs, capacity factors, operating costs, fuel costs (where relevant) and U.S. federal tax incentives on the levelized cost of energy.” Lazard, “Levelized Cost of Energy, 2013,” version 7.0., and Lazard, “Levelized Cost of Energy, 2009,” version 3.0.

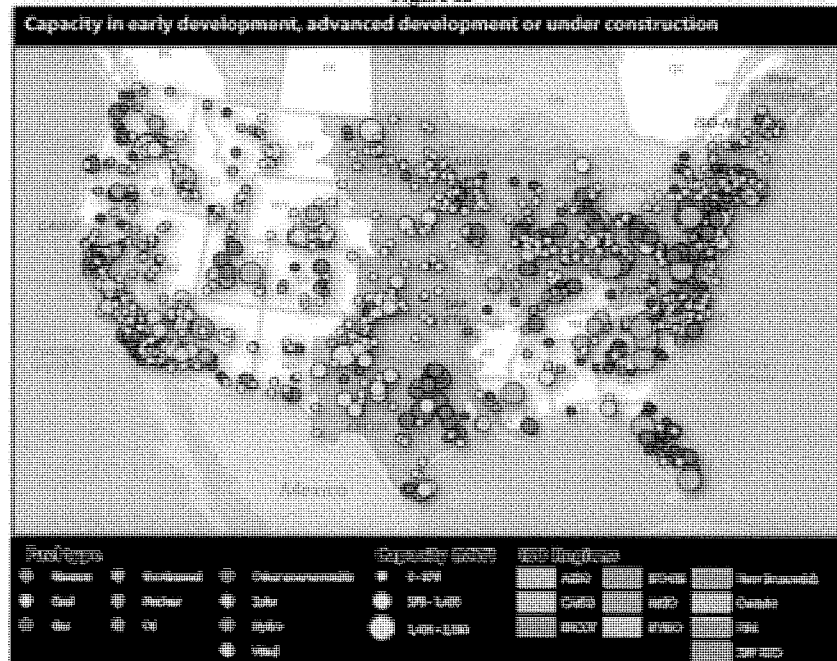
²⁴ 29 states and the District of Columbia have adopted requirements related to the percentage of retail electricity sales that need to be from renewable energy sources (e.g., renewable portfolio standards or renewable energy standards). Source: North Carolina State University’s N.S. Solar Center, Database of State Incentives for Renewables and Energy Efficiency, funded by the U.S. Department of Energy. (“DSIRE Database”), http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf

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and by stage of development, as of April 2013. Half of the power plant capacity under construction was at gas-fired power plants, and another 21 percent was at renewable projects. For other projects in advanced development (e.g., well along in permitting but not yet under construction), approximately one-third of the capacity was at gas-fired power plants, and another 42 percent was at renewable projects. In essence, three-quarters of the capacity under construction or in advance development was using these two domestic fuels, with a relatively small share (8 percent under construction, 14 percent in advanced development) to be fueled by coal.

Figure 12



Source: EIA, Data Dispatch, "Wind beats out gas, making up 35% of generation capacity in development," April 23, 2013.

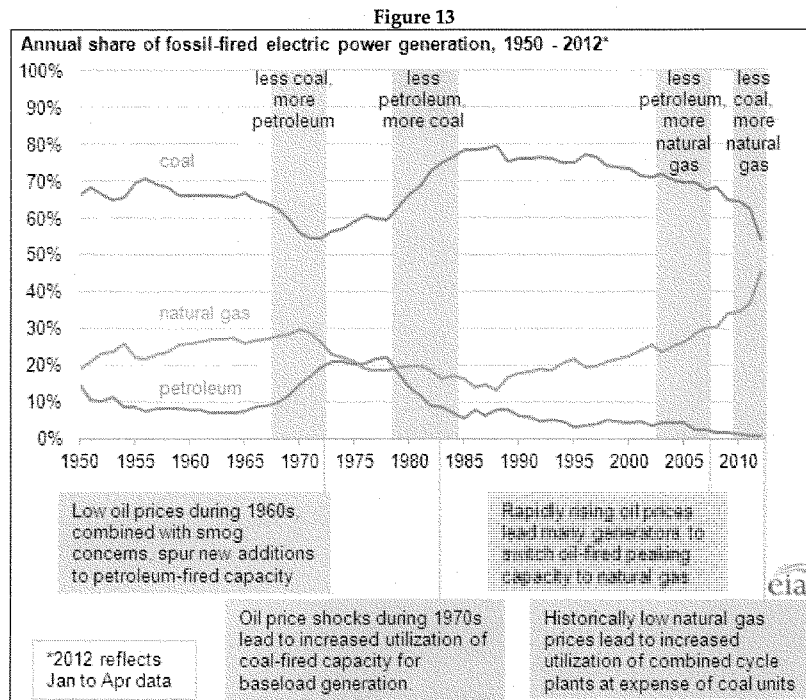
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Table 1

U.S. Planned Generating Capacity (MW) by Fuel Type and Development Status						
	Under Construction	Advanced Development	Early Development	Other Announced	Postponed	Total
Natural Gas	16,176	10,523	44,747	25,694	8,653	105,793
Wind	492	6,730	52,882	48,306	11,316	119,726
Solar	4,486	6,068	20,025	7,479	1,640	39,698
Water	583	134	8,295	43,702	5,283	57,997
Nuclear	5,614	3,494	27,098	8,150	5,900	50,256
Coal	2,489	4,731	2,000	516	3,350	13,086
Biomass	749	1,207	1,399	669	1,313	5,367
Geothermal	57	176	2,094	2,098	400	4,825
Other	45	855	180	772	0	1,851
Total	30,690	33,920	158,720	137,417	37,854	398,600
As of April 12, 2013. Source: SNL Energy						

The bottom line of current electricity market fundamentals is that coal and natural gas are in strong competition for market share based on their comparative economics. Such inter-fuel competition has long been a feature of the electricity industry. This fact is hardly new, as seen in the recent analysis depicting the shifting electric production patterns over the years (see Figure 13, from an EIA analysis from July 2012):



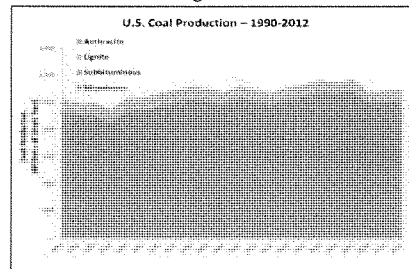
Source: EIA, "Today in Energy: Competition among fuels for power generation driven by changes in fuel prices," July 13, 2012.

f. U.S. domestic production of fossil fuels has remained relatively strong in part due to increased exports of coal in recent years

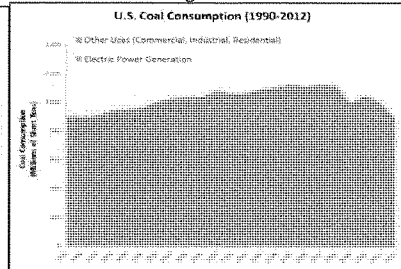
The recent changes in coal's use in power generation has taken place during a period in which U.S. domestic production of fossil fuels has remained relatively strong. The EIA estimates that the U.S. will become the world's largest producer of natural gas (and oil) in 2013.²⁵ And domestic

²⁵ EIA, "Today in Energy: U.S. expected to be largest producer of petroleum and natural gas hydrocarbons in 2013," October 4, 2013. <http://www.eia.gov/todayinenergy/detail.cfm?id=13251>

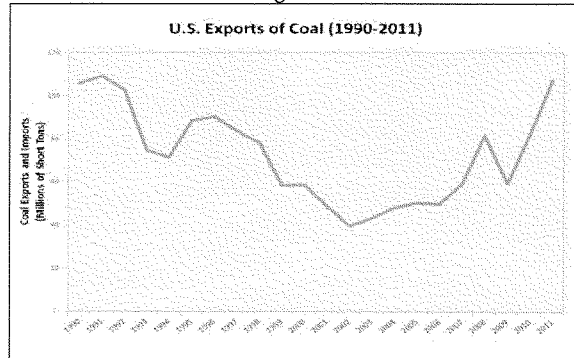
production of coal has remained relatively stable (see Figure 14), even as coal has lost some market share for power generation (see Figure 3) and it had declined in terms of absolute levels of consumption (see Figure 15). Production levels have been supported in part due to increased exports of coal in recent years (see Figure 16),²⁶ and also due to the continued role of coal as having the largest source of electricity supply in the U.S.

Figure 14

Source: EIA

Figure 15

Source: EIA

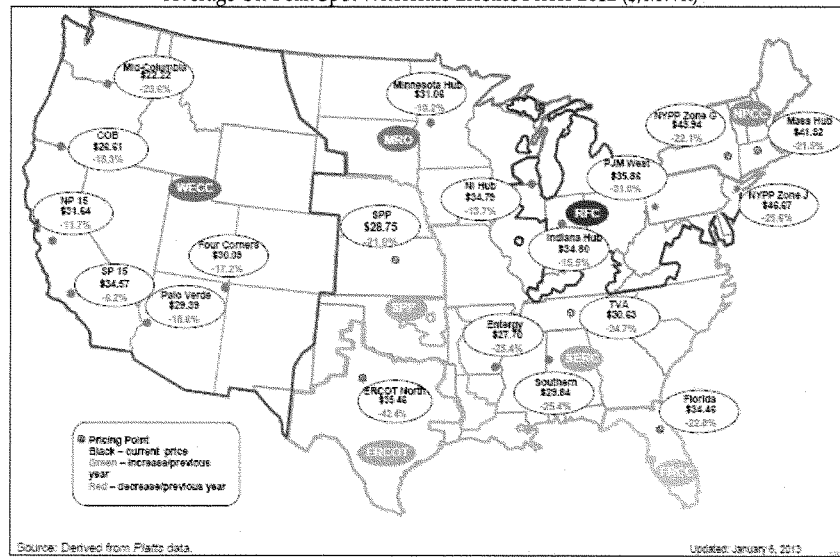
Figure 16

Source: EIA

²⁶ EIA, "Today in Energy: EIA: U.S. coal exports set monthly record," June 19, 2013.

Such market dynamics have been important for helping the electric industry provide power to consumers (and to the U.S. economy) at relatively low prices over the past few decades.²⁷ Figure 17 shows the downward movement in average wholesale power prices in 2012, relative to the prices in the prior year. Average prices dropped in all regions of the U.S.

Figure 17
 Average On-Peak Spot Wholesale Electric Prices 2012 (\$/MWh)



Source: FERC, <http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-on-pk-elec-pr.pdf>

Happily, recent developments have afforded the U.S. with the opportunity to simultaneously diversify its overall mix of power supplies using domestic energy resources and leading to long-term trends in lower emissions of most – although not all – key air pollutants from power plants.

²⁷ Electricity and natural gas expenditures have decreased as a percent of disposal income for most of the past three decades. Source: Bureau of Labor Statistics, cited by Dan Eggers, Credit Suisse.

(The recent drop in GHG emissions from the energy use is largely viewed to be the results of still-low demand for power combined with coal-fired generation being displaced by natural gas.²⁸)

The nation's various abundant and domestic fuels and energy resources are competing to supply affordable, reliable and clean electricity supply to consumers. This is beneficial for American consumers and for the economy, and EPA's actions under Section 111 will not adversely undermine the ability of the U.S. to rely on domestic resources for power generation.

2. EPA action under Section 111 of the CAA will help support competition among two key domestic fossil energy resources (coal and natural gas) for power generation

Allowing EPA to proceed with its planned action under Section 111 will help to clarify the 'rules of the road' under which coal and natural gas will continue to compete with each other and other fuels and technologies for assuring reliable, clean and efficient power supply for the nation's economy. Having clear rules and regulatory stability will help support a positive environment for investment at a time when new capacity is needed to be added in many parts of the country.

The U.S. electric industry is poised to invest significant new capital into the electric sector. In 2008, the Brattle Group estimated that the industry will make significant investments in power generation capacity, in the range of \$500 billion to nearly \$700 billion.²⁹ This investment will take

²⁸ "Energy-related carbon dioxide (CO₂) emissions in 2012 were the lowest in the United States since 1994, at 5.3 billion metric tons of CO₂ (see figure above). With the exception of 2010, emissions have declined every year since 2007. The largest drop in emissions in 2012 came from coal, which is used almost exclusively for electricity generation (see figure below). During 2012, particularly in the spring and early summer, low natural gas prices led to competition between natural gas- and coal-fired electric power generators. Lower natural gas prices resulted in reduced levels of coal generation, and increased natural gas generation—a less carbon-intensive fuel for power generation, which shifted power generation from the most carbon-intensive fossil fuel (coal) to the least carbon intensive fossil fuel (natural gas)." EIA, "Today in Energy: Energy-related carbon dioxide emissions declined in 2012," April 5, 2013.

²⁹ Mark Chupka, Robert Earle, Peter Fox-Penner, and Ryan Hledik, "Transforming America's Power Industry: The Investment Challenge 2010-2030," 2008.

place largely through private capital markets, which are well known to raise the cost of investment when they see risks of one sort or another.

Based on my interactions with electric industry executives and investors over many years, I observe that there is now a broad expectation among them that some form of regulation of GHG emissions from the U.S. power sector is inevitable. This has been the case especially since the U.S. Supreme Court made its finding in *Massachusetts v. EPA* – that the CAA gives the EPA the authority to certain GHG emissions from sources in the U.S.³⁰ This perspective assumes that there is intrinsic cost-related risks in the future associated with using fuels that emit GHG emissions.

The EPA is now proceeding under its well-noticed plan to propose and adopt regulations to set requirements for new fossil-fuel power plants under Section 111(b) (which is now in a proposed rule phase), and to issue guidelines under Section 111(d) that will require states to adopt state implementation plans to reduce GHG emissions from existing fossil-fuel power plants in the future. As of the end of 2013, EPA's proposed regulations and upcoming guidance have been anticipated for many years. Consideration of the bill that could inhibit EPA to take actions under Section 111 will complicate the industry's planning to respond to EPA policy, will raise the risk of investment at a time the nation needs to rely heavily on private capital markets to finance new investment, and will increase the cost of electricity to consumers. Given the state of markets for natural gas and coal for power generation, and the investment that will come about in the next few

³⁰ Such expectations have been in place at many investor-owned utility company owners of coal-fired power plants, in part as a result of shareholder requests to disclose carbon-related risks.

years to modernize the electric grid, it would be disruptive to investors to introduce further uncertainty about the 'rules of the road' at this point in time.

3. EPA action under Section 111 of the CAA will address significant air pollutants that threaten public health and the welfare of current and future generations of Americans

Given the electric sector's contribution of one third of the nation's GHG emissions, it is timely and responsible for EPA to proceed on its plan to set forth the terms under which natural gas and coal may have a role in power generation in the future. By now, there is a strong body of scientific knowledge,³¹ including the EPA's own record of decision on its endangerment finding, that points to the need to take action to reduce GHG emissions around the world, including in the U.S.

In my experience as a state utility regulator and a state cabinet officer responsible for implementing environmental regulations and as a consultant to businesses and other electric industry clients, I am aware of the tensions that often exist on the eve of implementing new regulations that will impose costs of an industry (and sometimes on the consumers of its products), and the fears that such regulations will lead to jobs losses. Often, though, the very capital investments and expenditures that will be made by the industry to respond to regulatory requirement can – and do – produce positive economic activities in the local and regional communities affected. There is no reasonable basis for believing any other outcome will occur as a result of allowing EPA action to proceed under Section 111 of the CAA.

³¹ From the recent report of the Intergovernmental Panel on Climate Change, "Climate Change 2013: The Physical Science Basis – Summary for Policymakers," October 2013: "Human influence on the climate system is clear." (page 13) It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century." (page 15) "Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions." (page 17)

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Conclusion

For these reasons, I strongly believe that it would be ill advised for Congress to enact the Whitfield-Machin bill. Coal will no doubt continue to play a large role in the nation's power supply, and the EPA's proposals open up such a pathway for coal as part of a long-term diverse, domestic and clean source of electricity for the nation. They will support fair and efficient competition among domestic supplies of energy. They will clarify the rules of the road under which new fossil-fuel power plants will compete in the future. And they will begin to address the pollution from GHG emissions from the power sector, for the benefit of current and future Americans.

Mr. WHITFIELD. Thank you.

And, Mr. Hawkins, you are recognized for 5 minutes.

STATEMENT OF DAVID HAWKINS

Mr. HAWKINS. Thank you, Mr. Chairman. I would like to offer a few facts for the subcommittee's consideration.

First, if we continue to use our atmosphere as a dump for carbon pollution, we will wreck the climate. Now, coal-fired power plants are the largest carbon pollution source in the United States, and more than 40 years ago Congress authorized, in the Clean Air Act, EPA to protect the public against harmful air pollution, and Supreme Court has confirmed that that authority includes the authority to regulate harmful carbon pollution.

EPA is moving ahead to set sensible standards for carbon pollution from power plants, and it is following an approach that has been used for 43 years by seven Presidents prior to President Obama. President Nixon, Ford, Carter, Reagan, George H.W. Bush, Clinton, and George W. Bush, all of those Presidents presided over EPA standard setting that looked at available technologies to control a pollution stream, looked at whether those technologies were transferable, or already applied in the category being considered for regulation, and looked at what the costs would be, and whether those costs would be reasonable.

That is exactly what EPA has done for the proposed standard for new coal-fired power plants, and it has based that technology on gas CO₂ capture systems, which have been demonstrated for decades in other major industry categories. The power sector has not used that technology yet, but that is not an argument against EPA's proposed standards, for the power sector did not use SO₂ scrubbers, NO_x controls, or mercury controls until government required them to use those controls.

Now, a few words about costs. Partial carbon capture, which is the basis for EPA's standard for new coal plants, can easily achieve that standard with reasonable added costs. What was EPA's basis for that? Well, it looked at a number of Department of Energy studies, and projected that a new coal plant with partial carbon capture would have electricity production costs about 20 percent higher than a coal plant with no carbon capture controls. Now, the cost difference would be much less if revenues from enhanced oil recovery sales were included.

EPA has also announced a schedule for guidelines to control carbon pollution from existing power plants, working in cooperation with state clean air officials. NRDC's own analyses, using an accepted government and industry model, demonstrates that we can achieve significant reductions in carbon pollution from existing power plants with benefits of about 25 to \$60 billion annually, compared to compliance costs of about \$4 billion. Our approach would not require the use of carbon capture on existing plants, though that, or any other measure that would reduce carbon pollution, could qualify as a compliance measure.

Now, the draft legislation by Representative Whitfield and Senator Manchin would repeal EPA's carbon pollution authority for existing power plants, and essentially would allow the power sector to dictate what standards could be adopted for new coal plants.

That is not the way the Clean Air Act was written. It is not the way any of the seven Presidents before have implemented it. This legislation would harm Americans by allowing excess carbon pollution from power plants that would stay in the air for centuries, disrupting the climate that sustains our civilization.

Ironically, the legislation would not improve the lot of coal producers or communities in coal country. Rather, it would destroy power sector interest in deploying carbon capture and storage systems, the one technology that could provide a pathway for a more sustainable use of coal.

Bills to cut Clean Air Act protections against carbon pollution will not solve the coal sector's problems. Power companies have choices other than coal, and as long as carbon policy remains temporarily locked in a closet, the industry will look elsewhere for their power investments. It makes no sense to invest billions of dollars in a new coal plant when there is no resolution of the rules that will apply to its carbon pollution. Congress cannot make this problem disappear by forcing EPA to close its eyes.

Thank you very much.

[The prepared statement of Mr. Hawkins follows:]

**BEFORE
the
SUBCOMMITTEE ON
ENERGY AND POWER
of the
HOUSE COMMITTEE ON
ENERGY AND COMMERCE
on
EPA'S PROPOSED GHG STANDARDS
FOR NEW POWER PLANTS
and
H.R.____, WHITFIELD-MANCHIN LEGISLATION
TESTIMONY
OF
DAVID G. HAWKINS,
DIRECTOR, CLIMATE PROGRAMS,
NATURAL RESOURCES DEFENSE COUNCIL
NOVEMBER 14, 2013**

Summary

The United States and other large carbon-polluting nations urgently need to take sensible steps to create an affordable, reliable energy system that is compatible with protecting the climate.

The Clean Air Act, passed by Congress more than 40 years ago, allows EPA to set reasonable standards that can cut harmful carbon pollution. EPA has already adopted successful standards for cars and trucks, the second largest source of U.S. carbon pollution.

EPA has proposed standards for new coal plants that are based on carbon capture technology, which has been proven through use on other large industrial categories. Partial carbon capture can easily achieve EPA's proposed standard with costs that are within the range of alternative investments for new plant owners who may be considering options other than natural gas combined-cycle plants.

EPA also has announced a schedule for guidelines to control carbon pollution from existing power plants, in cooperation with state clean air officials. NRDC's own analysis, using an accepted government and industry utility model, demonstrates that it is feasible to achieve significant reductions in the more than two billion tons of annual carbon dioxide pollution from power plants, with benefits of \$25 to \$60 billion annually, compared to compliance costs of about \$4 billion.

Draft legislation proposed by Representative Whitfield and Senator Manchin would repeal EPA's carbon pollution authority for existing power plants and would allow the power sector to dictate the standards that could be adopted for new coal plants. This legislation would harm Americans by allowing excess carbon pollution from power plants that would stay in the air for centuries, disrupting the climate that sustains our civilization. Ironically, the legislation would not improve the lot of coal producers or communities in coal country. Rather, it would destroy power sector interest in deploying carbon capture and storage systems -- the one technology that could provide a pathway for more sustainable use of coal.

Mr. Chairman and members of the Subcommittee, thank you for inviting me to present NRDC's views on the need for carbon pollution standards for fossil-fueled power plants and on draft legislation authored by Chairman Whitfield and Senator Manchin.

NRDC is a nonprofit organization with more than 350 scientists, lawyers and environmental specialists dedicated to protecting the environment and public health in the United States and internationally, with offices in New York, Washington D.C., Montana, Los Angeles, San Francisco, Chicago, and Beijing.

Founded in 1970, NRDC uses law, science and the support of 1.3 million members and online activists to protect the planet's wildlife and natural environment, and to ensure a safe, healthy environment for all living things. NRDC's top institutional priority is curbing global warming and building a reliable, affordable and clean energy future.

We urgently need effective measures to cut dangerous carbon pollution from U.S. power plants and EPA is proceeding appropriately to use the authority Congress granted it in the Clean Air Act. The draft Whitfield-Manchin bill would repeal EPA's authority to implement standards for carbon dioxide (CO₂) and other greenhouse gas pollutants from existing fossil-fueled power plants and effectively allow the power sector to dictate the terms of any such standards for new coal-fueled power plants. This would be a major weakening of the Clean Air Act and NRDC urges you to oppose this legislative proposal.

Manmade "greenhouse gas" GHG pollution, including CO₂, is disrupting the climate that has supported the rise of modern civilization over the past 20,000 years. If we do not act now to cut these harmful pollutants, we will lock in dangerous changes to our climate system that will result in death, disease and misery for billions of people over hundreds of years into the future. Fortunately, the United States has the economic strength, technical know-how and policy instruments that can show the world that we can address this threat in a manner that secures our economic future.

In 2007 and again in 2011 the U.S. Supreme Court ruled that the Clean Air Act authorizes EPA to set sensible safeguards for CO₂ and other GHG pollutants. EPA has already set GHG standards for new cars and trucks, with the cooperation of domestic and foreign manufacturers. EPA is now in the process of developing standards for the largest U.S. source of CO₂ pollution, fossil-fueled power plants.

Fossil-fueled power plants are also the largest CO₂ source globally. We cannot protect ourselves from the harms of a severely disrupted climate system unless we set effective standards to limit carbon pollution from these plants.

As you know, EPA has proposed, and repropoed, CO₂ standards for new natural gas and coal power plants. Under the Clean Air Act, EPA bases new source emission standards on the demonstrated capability of known technology, although source operators are free to use any approach they choose to meet the emission limits. In its recent reproposal, EPA based the proposed standard for new coal plants on currently available systems that capture CO₂ from large industrial gas streams. Once captured, CO₂ is compressed and transported typically via pipeline to geologic formations, where it can be isolated from the atmosphere while it is slowly converted back into a mineral form.

All aspects of these carbon capture and storage (CCS) systems have been demonstrated at commercial scale industrial facilities for decades.¹ They have operated reliably over multi-year periods to capture, transport, and safely dispose of millions of tons of CO₂. They can be readily applied at power plants, although to date, CCS has been used only to capture a small fraction of CO₂ emissions at a handful of power plants, typically for sale to the food and beverage industry.

¹ A useful summary of relevant CCS experience can be found in testimony presented by the Clean Air Task Force on October 29, 2013 before the House Committee on Science, Space, and Technology. See, http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY18-WState-KWaltzer-20131029_0.pdf

The reasons the power sector has not used CCS more broadly are not because of any technical shortcomings. Rather, the sector has not applied CCS because of a policy failure: up to now, there has been no national requirement to limit carbon pollution from power plants. CCS systems, like SO₂ scrubbers, mercury controls, fine particulate controls, and nitrogen oxide controls, are not free. With rare exceptions, none of these other systems were used before there were regulatory requirements to control these pollutants. Likewise, in the absence of any requirement to limit CO₂ pollution from new or existing power plants, there has been simply no reason for owners and builders of power plants to install CCS systems.

Large coal-based power companies themselves have argued that they cannot finance CCS systems without federal CO₂ standards. For example, in announcing the abandonment of a large-scale CCS project in 2011, the CEO of American Electric Power stated, “as a regulated utility, it is impossible to gain regulatory approval to recover our share of the costs for validating and deploying the technology without federal requirements to reduce greenhouse gas emissions already in place. The uncertainty also makes it difficult to attract partners to help fund the industry’s share.”²

As with other control technologies, there are some rare pioneers for CCS. Currently several plants that will include CCS are either under construction or in the advanced pre-construction stage. Southern Company’s new Kemper County, Mississippi coal plant and the refurbished coal plant at the Boundary Dam site in Canada are examples of CCS-equipped coal power projects nearing the end of construction. The Summit Power project in Texas and the Hydrogen Energy project in California are examples of CCS-equipped projects in the advanced pre-construction stages.

² <http://www.aep.com/newsroom/newsreleases/Default.aspx?id=1704>

Nonetheless, opponents of regulating CO₂ from power plants are arguing that EPA may not legally, or should not, base standards for new coal plants on this technology because it is not already widely used on power plants.

These arguments are wrong, both as a matter of law and of sound policy. The courts have upheld EPA's authority under the Clean Air Act to base New Source Performance Standards for a given industrial category on technologies whose performance has been demonstrated at other industrial categories.³ There is a sound policy basis for this interpretation of the law. In many cases (as is the case here), the failure of a particular industry to employ a demonstrated technology is due to the lack of any legal requirement to limit its emissions. If the law allowed a particular industry to immunize itself from requirements to use available, feasible control technologies just by refusing to adopt them voluntarily, the industry would be put in full control of whether it would ever have to improve its performance. That is precisely what the Whitfield-Manchin legislation would do: the bill as drafted would erect a permanent bar on EPA's basing a standard on CCS or any other technology until the industry decided to deploy that technology, voluntarily and without any government financial support, at numerous coal power plants. The bill would take the keys to clean air and climate protection from EPA and hand them to industry, no questions asked.

Turning to EPA's proposal for new power plants, the agency considered several options for new coal plant CO₂ limits, ranging from no CCS, partial CCS, to full (90%+ capture) CCS. EPA selected partial CCS as the basis for the proposed standard, after considering both technical and cost issues. EPA found that partial CCS was well demonstrated at relevant industrial scales and that when applied to coal power plants, partial CCS would have reasonable economic impacts.

³ See, e.g., *Lignite Energy Council v. EPA*, 198 F.3d 930 (D.C. Cir. 1999).

EPA's cost assessment started with the observation that under current and expected market conditions, new natural gas combined cycle (NGCC) power plants would typically have lower electricity production costs (levelized cost of electricity) than new coal units, even if no CCS were required for the coal unit.

But EPA noted that there might be instances where factors other than electricity production costs might cause investors or regulators to choose to build a coal plant or other non-NGCC power plant.

Accordingly, EPA compared the projected cost (using Department of Energy reports) of a coal unit with CCS to a coal unit without CCS and to other non-NGCC options, such as nuclear, biomass, and geothermal power plants.

In its analysis, EPA concluded the projected costs of a coal plant with partial CCS would range from \$92 to \$110 per Megawatt-hour (MWh) and this compared to a range for other non-NGCC options of \$80 to \$130 per MWh. Specifically, in comparing a new coal unit with *no* CCS to a coal unit with partial CCS, EPA found that applying partial CCS would increase the power production costs⁴ compared to the no-CCS case by 20% -- from \$92 per MWh to \$110 per MWh, if the CCS project received no revenues from the sale of CO₂ for enhanced oil recovery (EOR). If the income from CO₂ sales for EOR is included, the net production cost from the new CCS-equipped unit would range from \$88 to \$96 per MWh, depending on the price received for the captured CO₂.⁵

In sum, EPA's proposal for new coal plants is based on a careful review of industrial experience with large-scale CO₂ capture technology. EPA has compared projected costs of a new coal unit applying partial CCS with several other generation options and concluded the additional power production costs are 20% or less. EPA found these costs to be reasonable, given the substantial reduction in emissions that partial

⁴ Power production costs are only a portion of a customer's bill. Typically, about 40% of the bill consists of transmission, distribution and administrative costs. Moreover, in most systems, any single new power plant is only a small part of the total generating fleet whose costs go into the customer rate base. Thus, the increase in a customer's rates will be smaller than the increase in production costs at a new power plant.

⁵ US EPA, "Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units," at 240. <http://www2.epa.gov/sites/production/files/201309/documents/20130920proposal.pdf>

CCS would achieve at a new coal unit and the importance of providing a policy framework to support the use of CCS if new coal units are built.

EPA has started a process to develop standards for existing power plants under Section 111(d). Some in industry who want to stop both the new and existing plant standards are intimating that the agency must have a secret plan to impose a CCS requirement on every existing plant. There is no basis for this claim, which is designed to sow fear and confusion. Administrator McCarthy has made clear that one should not assume the existing plant standard will mirror the new source one. Even a proposal for existing plants that we at NRDC have developed would not impose a CCS mandate.

The Whitfield-Manchin discussion draft

Chairman Whitfield and Senator Manchin have responded to EPA's actions by circulating a draft bill that would allow coal plant owners to dictate what standards the government would be allowed to adopt for new coal plants. Second, the draft would completely repeal EPA's authority to implement any GHG standard for any existing fossil-fueled utility power plant.

NRDC strongly opposes the Whitfield-Manchin draft bill and if it is introduced, we will urge members to vote against reporting it out of the Subcommittee. The bill would render useless a key provision of the 1970 Clean Air Act—a law proposed and signed by President Richard Nixon—for controlling dangerous pollution from the nation's largest source category of that dangerous pollutant, fossil-fueled power plants. If this bill became law, it would effectively block any effort to curb fossil power plants' unlimited dumping of carbon pollution into our air, pushing us ever faster along the path to unmanageable climate disruption. The power sector now pollutes our air to the tune of more than 2 billion tons of CO₂ carbon pollution every single year, far outpacing the next largest category, motor vehicles.

EPA is using the Clean Air Act to cut carbon pollution substantially from the vehicle sector in a manner that is helping our economy while helping to protect our kids from climate disruption, and has now turned to the same task for power plants, the country's biggest carbon polluters. The Supreme Court has upheld EPA's carbon pollution authority twice, for vehicles in *Massachusetts v. EPA* in 2007, and for power plants in *American Electric Power v. Connecticut* in 2011. This bill effectively repeals the Clean Air Act authority for power plants.

It is a mistake to lay all the troubles of the coal industry on the Clean Air Act, and a mistake to believe that gutting the Clean Air Act will bring back the days of high coal consumption. In fact, this bill's biggest impact, if it were to become law, would be to cause investors and government actors to turn their backs on deploying CCS, the only technology that can make continued coal combustion compatible with our carbon-constrained future.

You all operate under a two-year license, with just one year left before you apply to the people for renewal. I know you take seriously your responsibilities as representatives of the people. In that spirit I ask that you consider the long-lasting damage this bill would do if it became law – your constituents and other Americans would be harmed by it for decades after your term in office.

The billions of tons of excess carbon pollution that power plants could release under this bill would stay in the atmosphere for more than a century, harming our children, grandchildren, and generations that follow. One hundred years from now, half of that excess pollution would still be up there, contributing to illness, flooding, droughts, crop losses, and other harms to real human beings—some of them the very children, grandchildren and great-grandchildren of the constituents who voted for you to protect their interests. Telling EPA it must ignore this pollution would be a toxic legacy akin to telling the Nuclear Regulatory Commission to set standards for radioactive waste only at levels agreed to by nuclear power

plant owners. Consider what you will say to your own grandchildren when they ask you years from now how you voted on this proposal and why.

This bill harms U.S. interests by making it harder for us to get other large polluter nations to cut their carbon pollution. While the U.S. is still history's largest carbon-polluter nation, as measured by cumulative emissions, we cannot protect ourselves by our actions alone. We need a strategy that helps us persuade other large polluter nations that we must all act in concert to protect our common future by moving quickly to a cleaner energy economy.

We are rightly proud of the many areas where the U.S. has been a model for the betterment of the human condition and that record is particularly strong when it comes to health and environmental protection. With the Clean Air Act we have constructed a model of environmental leadership that has helped the U.S. enjoy a reputation in the world that others can only wish they could achieve.

The Clean Air Act has worked: more than 40 years ago we began to cut sulfur emissions from power plants and this incredibly important public health initiative has spread around the world. We set ambitious tailpipe standards from cars and trucks and now the rapidly growing economies of Asia are requiring limits as good as or better than ours. We moved to take lead out of gasoline and the world has followed. And most recently, we acted to cut mercury and other toxins from power plants and this led to successful negotiation of a new international agreement under which other countries will act to cut these dangerous pollutants. When we lead, the world follows.

If this bill became law, it would make it much more difficult for the U.S. to convince other countries to act to cut their own climate-disrupting pollution. Since our citizens will suffer the harm from continuing today's level of carbon pollution around the world, the bill is directly contrary to U.S. interests. It would create exactly the wrong model for other countries: it would be a model of a country that ignores the scientific evidence, directs its environmental regulators to put on blinders to technologies that can

reliably and affordably cut emissions from the largest sources of harmful pollution, and puts the polluters in charge of determining whether the government will be allowed to protect its citizens.

From the perspective of coal advocates, the rationale for this bill appears to be that Congress can protect the volumes of coal consumed by the power sector by prohibiting EPA from setting any meaningful limits on carbon pollution from power plants. This tactic simply will not work.

A careful examination of the forces confronting the coal industry shows that handcuffing EPA cannot be a successful way to improve the lot of coal producers or coal communities. Most U.S. coal use is in the power sector and the power sector has choices for the resources it uses. The bill seems to ignore the obvious fact that power producers are not in business to burn coal. Their business interest is in supplying electricity resources and their fuel and technology choices will be driven by market forces that together are much more powerful than the effects of Clean Air Act standards on power production prices.

The biggest drivers of the market's continuing shift away from coal in the power sector are –

- the comparatively lower costs of natural gas as a fuel,
- the comparatively lower capital costs of natural gas power plants,
- the expanded penetration of renewables, particularly wind,
- the success of demand side management in reducing both annual and peak demands for power,
- and the conviction in much of the investor community, that climate science and observed climate disruptions will lead to public demands for policies to limit carbon emissions, likely before investments in new or refurbished coal plants are recouped.

Ironically, this bill would stop the improvement of the one technology that is essential if coal and natural gas are to continue to be a substantial energy resource: CCS. The bill cannot and will not do anything to deal with the fundamental issues facing the continued use of coal. If it became law (which it almost

certainly will not), it would be at most only an anesthetic that might provide coal producers with some short-term pain relief but at the cost of causing investors and government actors to turn their back on deploying CCS. This would leave the coal industry where it is today: unable and unwilling by itself to build CCS projects that provide cost-cutting practical experience at pertinent scales, trying to maintain sales to power sector customers that are increasingly not wedded to coal and thus quite apathetic about building CCS projects themselves.

Perhaps inadvertently, the bill essentially ensures that coal producers will have no chance of turning CCS into a real option for power sector investors. By telling coal producers' customers (power plant owners) that they can indefinitely avoid any meaningful EPA limits on carbon pollution by simply declining to pursue CCS projects, the bill eliminates any incentive for power producers to put their political and financial muscle into an effort to solve coal's carbon problem.

Indeed, if this bill were law, it would tell power plant owners that pursuing a CCS project would be against their economic interests because it would speed the day when the handcuffs on EPA's authority would be removed.

The reality is that hamstringing EPA will not keep coal from continuing to lose market share in the U.S. Instead, it will cause the power sector to look elsewhere to hedge its bets against the implications of climate disruption. Some in the coal-producing sector may think one can deal with climate disruption by enacting laws decreeing that we shall ignore it. But based on my conversations with many leaders in the power sector, that is not a view shared by the people who will be deciding what investments to make in new and existing power systems.

Some claim that today there is a "war on coal," while others, considering the health and environmental costs inflicted by today's use of coal to make electricity, say it is a "war by coal." But these charges and countercharges will not get us where we need to go as a society. What all of us need, both coal

promoters and coal critics is a broader consensus on sensible steps we can take to put our energy system on a more sustainable course. I continue to believe that it is possible to forge a consensus that includes a role for coal, at least as our society transitions in an orderly manner to resources that will function reliably to power growth without disrupting the climate we depend on to sustain modern economies.

A bill approved by this committee in 2009 and passed by the House a few months later demonstrates that it is possible to garner the support of many legislators far from “coal country” for policies that would give coal an opportunity to define a role for itself as a continuing part of the U.S. energy mix. That bill, authored by two Democrats from states not dependent on coal, included about \$60 billion in financial support for deployment of CCS on coal-fueled power plants. It is worth noting as well, that many environmental organizations that believe coal use must be phased out quickly nonetheless supported this legislation.

The Waxman-Markey bill did not become law but it does stand as a reminder that it is possible to broaden political support among elected officials from around the country for policies that could in fact provide a pathway for coal to earn a continuing role as a significant U.S. energy resource.

The Whitfield-Manchin draft bill would create a huge obstacle to reviving any potential consensus for incentives to deploy CCS. It is based on a fundamentally flawed strategy: that by barring EPA from considering practical, available technologies that can reduce power plant carbon pollution, Congress can spur new coal plant investments and keep old coal plants running indefinitely. Succeeding with this strategy would require investors, power company managers, and state utility regulators to deny both economic and climate risks.

A new coal plant without CCS is simply not equipped to manage the risks that it will face in the marketplace. Some coal producers may be able to persuade themselves that it makes sense to spend several billion dollars on a machine that will be the dirtiest new power option in the United States. But

coal producers won't be building power plants and the people who will be, are not going to believe that this bill provides them a stable platform for investing billions in projects that won't even be on line for perhaps another decade.

Power sector investors are increasingly learning from Wayne Gretzky: they are skating to where the puck will be, not where it is now. This bill tries to tell them there is no puck and that just won't fly.

Section-by-section discussion

The core substantive provisions of the bill are found in sections 2 and 3.

Section 2 of the discussion draft establishes a special hurdle for any new source performance standards for GHGs from new coal-fueled power plants. EPA would be barred from setting a GHG emission limit for new coal plants unless the limit has already been achieved at a minimum of six coal units located at six different U.S. generating stations. The stations must be in parts of the country that represent different operating characteristics of generating units. Third, EPA must ignore any results from any CCS projects that receive any government funding or financial assistance. Finally, the bill would require a separate standard for units using coal with average heat content of 8300 or less British Thermal Units per pound, with a requirement that the standard be no more stringent than the level achieved by three units, in different U.S. locations, using such lower-rank coal.

These criteria are designed to prohibit EPA from setting a GHG standard for new coal units that is any better than what at least six existing units are already achieving. By ruling out any units with CCS systems that have received any government financial assistance, the bill creates a condition for any meaningful GHG standard that is effectively impossible to meet. Suppose we assume that in this era of projected minimal new coal unit construction, six new coal units with CCS would be built. Under the bill, the owners of such plants could prevent EPA from basing a standard on their performance, by taking just one dollar of federal, state, or local financial assistance. What do you think they would do?

This is policy reminiscent of Kafka. If this bill became law, the most that EPA could do respecting GHG pollution from new coal units would be to adopt a do-nothing standard.

Section 3 of the draft repeals the Clean Air Act authority to reduce GHG pollution from existing or modified fossil power plants under section 111 of the Act. It does this by specifying that any such standards or guidelines shall not be effective unless Congress enacts a law specifying an effective date. This is a remarkable example of a sweeping repeal of an important law, based on nothing but speculation of how EPA *might* exercise its current Clean Air Act authority.

At this stage, the President and EPA have only set forth a schedule for the issuance of proposed and final guidelines under section 111(d) and a date for submission of state plans. One would hope that members of this Subcommittee would want to at least examine whether there might be steps that could be taken under section 111(d) that could become a reasonable program for reducing carbon pollution from the power sector.

Even in coal country not everyone believes that this Clean Air Act authority should be repealed. For example, the Chairman's own Commonwealth of Kentucky has provided a white paper to EPA outlining a framework for 111(d) guidelines that it describes as demonstrating that "we can achieve reductions to meet President Obama's goals in a meaningful manner that does not jeopardize our state's economy."⁶

NRDC has carried out analyses, using the contractor and utility model used by EPA and various power companies, that we believe demonstrate that significant reductions in carbon pollution from existing fossil power plants are possible, with benefits for Americans that would far outweigh the modest costs of compliance. As outlined in the attached Issue Brief,⁷ by implementing guidelines that would permit compliance using a range of power system resources, states could reduce power sector carbon pollution

⁶ Letter of October 22, 2013 from Leonard K. Peters, Secretary, Kentucky Energy and Environment Cabinet, to EPA Administrator Gina McCarthy.

⁷ NRDC, "Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants, Creating Clean Energy Jobs, Improving Americans' Health, and Curbing Climate Change," December 2012, IB:12-11-C. <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-IB.pdf>

by 26% from 2005 levels by the year 2020 at a compliance price tag of about \$4 billion per year. But this program would deliver public health and climate protection benefits of \$25 to \$60 billion per year – benefits 6 to 15 times greater than the costs. Under the program analyzed by NRDC, pollution cuts could be achieved without increasing natural gas consumption or natural gas prices above business as usual projections. Wholesale electricity prices were not projected to increase above the business as usual case either.⁸

NRDC's proposal is one example of the opportunity to use the Clean Air Act creatively to start addressing the problem of continuing carbon pollution from America's power plants. Whether one prefers NRDC's approach, the approach developed by Kentucky, or some other approach, EPA has a process underway that should not be overridden by a poorly considered repeal of this important Clean Air Act authority. There will be ample opportunities for all voices to make their views known in the process EPA has begun. And the courts are available to review EPA's decisions to assure that they follow the law that Congress has already written.

The Clean Air Act is a showcase success story for America. It has worked to save tens of thousands of lives and avoid countless illnesses, while creating new markets for American technical ingenuity. This great creation of Congress can work to cut carbon pollution too and we urge the members of the Subcommittee to give clean air a chance.

Thank you for inviting me to testify. I will be happy to answer any questions you may have.

⁸ <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf>, Figure 11.2

ATTACHMENT

NRDC ISSUE BRIEF ON CARBON POLLUTION STANDARDS

FOR EXISTING POWER PLANTS

Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants, Creating Clean Energy Jobs, Improving Americans' Health, and Curbing Climate Change

On the night he was re-elected, President Obama told the nation that he wants "our children to live in an America...that isn't threatened by the destructive power of a warming planet." In his first post-election press conference the President defined how by saying, **"we can shape an agenda that says we can create jobs, advance growth and make a serious dent in climate change and be an international leader."**

We agree. Climate and energy experts at the Natural Resources Defense Council have crafted a groundbreaking proposal to do just that.

This administration can create jobs, grow the economy, and curb climate change by going after the country's largest source of climate-changing pollution—emissions from the hundreds of existing power plants. NRDC's proposal shows how the Environmental Protection Agency, in partnership with the states, can set new carbon pollution standards under existing authority in the Clean Air Act that will cut existing power plant emissions 26 percent by 2020 (relative to peak emissions in 2005). The approach includes an innovative provision that will drive investment in cost-effective energy efficiency, substantially lowering the cost of compliance, lowering electricity bills, and creating thousands of jobs across the country. Further, NRDC's analysis shows that the benefits—in saved lives, reduced illnesses and climate change avoided—far outweigh the costs, by as much as 15 times.

Having endured a year when climate change contributed to damaging floods, widespread wildfires, record drought and superstorm Sandy, which cost Americans hundreds of lives and hundreds of billions of dollars, we can't afford to wait any longer to act. For the health and welfare of Americans, for the nation's economy, and for the stability of the planet, now is the time to reduce pollution from America's power plants, dramatically increase the energy efficiency of our economy and reduce the threat of climate change.

We know where the pollution is; now we just have to go get it.

THE IMPERATIVE TO CUT CARBON POLLUTION

Unless heat-trapping carbon pollution is sharply reduced, negative impacts on the health of our families, communities, economy and our planet will only grow.

Already, climate change is increasing the numbers of record heat waves, droughts, and floods—and these extreme weather events will become even more powerful and frequent, threatening both lives and the global economy. In the wake of superstorm Sandy, which devastated swaths of the U.S. coastline, states and cities must rebuild for this new reality. But simply preparing for more extreme weather is not an answer by itself. Future storms will be stronger and do even worse damage unless we act now to curb the carbon pollution that is driving dangerous climate change.

To this end, nothing is more important than reducing carbon dioxide (CO₂) emissions from the largest industrial source of pollution: electricity-generating power plants. In the United States these plants emit about 2.4 billion tons of CO₂ each year, roughly 40 percent of the nation's total emissions.

To be sure, the EPA has taken important first steps by setting standards that will cut the carbon pollution from automobiles and trucks nearly in half by 2025 and by proposing standards to limit the carbon pollution from new power plants. But the EPA has yet to tackle the CO₂ pollution from hundreds of *existing* fossil-fueled power plants in the United States.

PAGE 1

Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants, Creating Clean Energy Jobs, Improving Americans' Health and Curbing Climate Change

The EPA has both the authority and responsibility to reduce pollution from these plants under the Clean Air Act, the nation's bedrock air pollution law adopted in 1970. NRDC has crafted an effective and flexible approach to cut carbon pollution from existing power plants that:

- ☛ Uses the legal authority under the Clean Air Act.
- ☛ Recognizes differences in the starting points among states.
- ☛ Charts a path to affordable and effective emissions reductions by tapping into the ingenuity of the states and the private sector.
- ☛ Provides multiple compliance options, including cleaning up existing power plants, shifting power generation to plants with lower emissions or none at all, and improving the efficiency of electricity use.

Using the same sophisticated integrated planning model used by the industry and the EPA, NRDC calculated the pollution reductions that would result from the proposed approach—and the costs and benefits of achieving those reductions.

The plan would cut CO₂ pollution from America's power plants by 26 percent from 2005 levels by 2020 and 34 percent by 2025. The price tag: about \$4 billion in 2020. But the benefits—in saved lives, reduced illnesses, and climate change avoided—would be \$25 billion to 60 billion, 6 to 15 times greater than the costs. For Americans' health and welfare, for the nation's economy, and for the health of the planet, we can't afford *not* to curb the carbon pollution from existing power plants.

EPA HAS THE LEGAL AUTHORITY AND OBLIGATION TO REDUCE CARBON POLLUTION

The Clean Air Act has been remarkably successful over its 40-year history. Most Americans now breathe much cleaner air, our cities are no longer enveloped in smoke and smog, the nation's lakes and rivers are recovering from acid rain, and the ozone layer that shields us from dangerous ultraviolet radiation is healing after the phase-out of CFCs and other ozone-destroying chemicals.

The Clean Air Act can also help stem the threat of climate change by reducing carbon pollution. In 2007, in *Massachusetts v. EPA*, the U.S. Supreme Court ruled that the EPA has the authority and responsibility to curb heat-trapping pollutants under the Clean Air Act, rejecting the Bush Administration's claim that greenhouse gases are not pollutants under that law. In that case, the nation's highest court ruled that if the science shows CO₂ and other heat-trapping pollutants endanger public health and welfare, then the EPA must set standards to reduce their emissions from new cars and trucks.

In President Obama's first term, the EPA responded to the Supreme Court decision by presenting overwhelming scientific evidence that CO₂ and the other heat-trapping pollutants do indeed endanger public health and welfare. The administration then set new standards in 2010 and 2012 to dramatically cut the carbon pollution from new cars and SUVs and from heavy trucks and buses.

In a second Supreme Court decision in 2011, *American Electric Power v. Connecticut*, the high court ruled that it is also the EPA's responsibility to curb the carbon pollution from the nation's power plants. The legal authority for power plant standards comes from Section 111 of the Clean Air Act, which directs the EPA to set "standards of performance" (typically a maximum emissions rate) for stationary sources like power plants that emit harmful air pollutants. Section 111(b) covers new facilities, while Section 111(d) gives the EPA and states shared responsibility for curbing pollution from existing facilities. Under Section 111(d), the EPA issues guidelines on "the best system of emission reduction," and then each state is required to adopt and submit a plan for setting and meeting emissions standards.

In April 2012, the agency took the first step toward addressing power plant pollution by proposing the "Carbon Pollution Standard for New Power Plants" under Section 111(b). The standard would require that new plants emit no more than 1,000 pounds of CO₂ per megawatt-hour (lbs/MWh). To put that in context, coal power plants typically produce about 2,100 lbs/MWh, while natural gas-fired plants emit 1,000/MWh or less. Power companies building new facilities could thus meet the standard with existing natural gas power plant technologies, zero-emitting renewables, or with efficient coal plants equipped with systems to capture and sequester carbon dioxide.

The EPA's assessment, widely shared in the private sector, is that even without the proposed carbon pollution standard new power supply needs will be met by a combination of natural gas, renewables, energy efficiency, and other resources because the construction of new conventional coal-fired power plants is uneconomic. The new source standard is expected to be finalized in the next few months.

EPA, however, still hasn't addressed the largest source of carbon pollution, *existing* power plants. NRDC's approach addresses the challenge of creating equitable regulations for these sources under Section 111(d), recognizing that the type and mix of power plants varies among the states. If all existing power plants were limited to 1,000 lbs of CO₂/MWh, for instance, states with a high percentage of coal-fired plants would face a much larger task compared to those with lots of natural gas plants or renewables. The flexible approach NRDC proposes will help reduce the carbon pollution from existing power plants in a fair, affordable, and achievable manner.

PAGE 2

Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants,
Creating Clean Energy Jobs, Improving Americans' Health and Curbing Climate Change

STATE-SPECIFIC STANDARDS AND FLEXIBLE COMPLIANCE OPTIONS

The NRDC plan has two key elements:

(1) EPA would set state-specific emissions rates, reflecting the diversity of the nation's electricity sector, as well as the state-by-state structure of Section 111(d).

(2) Power plant owners and states would have broad flexibility to meet standards in the most cost-effective way, through a range of technologies and measures.

Here's how it would work: the EPA would first tally up the share of electricity generated by coal and gas-fired plants in each state during the baseline years (2008-2010 was used for this analysis). Then the agency would set a target emission rate for each state for 2020, based on the state's baseline share of coal and gas generation. The state standards proposed and analyzed in this report were calculated by applying a rate of 1500 lbs of CO₂/MWh for the baseline coal generation share and 1000 lbs of CO₂/MWh for the baseline gas-fired generation share.

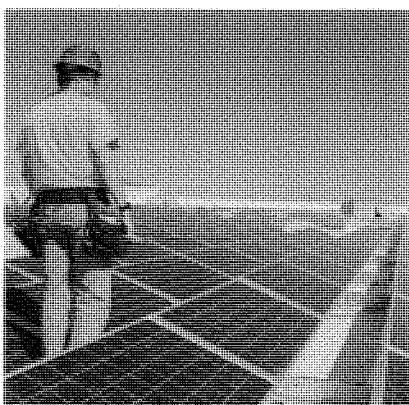
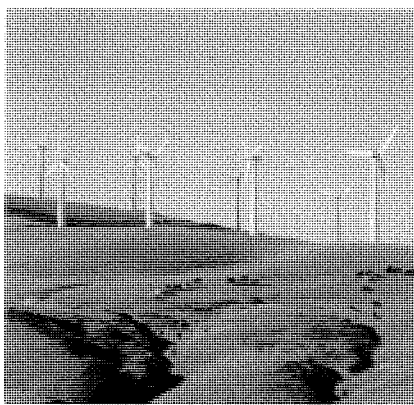
For example, a state that now gets 90 percent of its fossil-fueled electricity from coal and 10 percent from gas would be required to reduce its 2020 emissions rate to 1450 lbs/MWh $[(90 \text{ percent} \times 1500) + (10 \text{ percent} \times 1000)]$. In contrast, a state with 90 percent gas-fired generation would have a target of 1050 lbs/MWh $[(10 \text{ percent} \times 1500) + (90 \text{ percent} \times 1000)]$. A state starting with a 50:50 ratio of coal and gas generation would have a target of 1250 lbs/MWh. The allowable emissions rate would drop further in 2025.

The emissions standard for each state would be an overall emission rate average of all fossil fuel plants in the state. An individual plant could emit at a higher or lower rate.

Each covered plant with an emission rate above the state standard could meet the standard by using one or more compliance options: First, a plant could reduce its own CO₂ emission rate by retrofitting a more efficient boiler or installing CO₂ capture systems, for instance, or it could burn a mixture of coal and cleaner fuels, such as gas or certain types of biomass.

Second, the owners of multiple power plants could average the emissions rates of their plants, meeting the required emission rate on average by running coal plants less often, and ramping up generation from natural gas plants or renewable sources instead. They could retire coal plants and build new natural gas and renewable capacity, if needed, creating a cleaner overall electricity-generating fleet. Low- or zero-emitting sources, such as wind and solar, would earn credits that generators could use to lower their average emissions rate. The plan also allows trading of credits between companies within a state, and across state lines among states that choose to allow it, further lowering the overall costs of compliance.

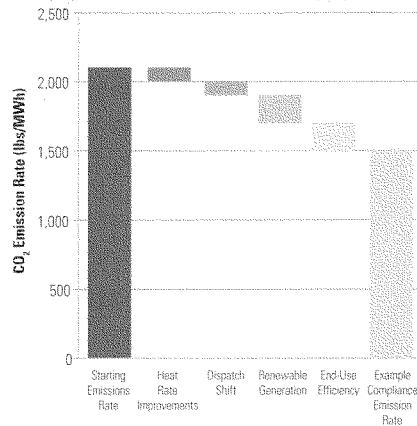
An innovative feature of the proposal is the inclusion of energy efficiency. State-regulated energy efficiency programs could earn credits for avoided power generation, and avoided pollution. Generators could purchase and use those credits towards their emissions compliance obligations, effectively lowering their calculated average emissions rate. Energy efficiency is one of the lowest cost energy resources and emission reduction options. States could use this provision to slash emissions without costly and lengthy power plant retrofits or new construction, reducing the overall cost of the regulations.



PAGE 3

Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants,
Creating Clean Energy Jobs, Improving Americans' Health and Curbing Climate Change

Figure 1: Generator Compliance; Illustrative Example

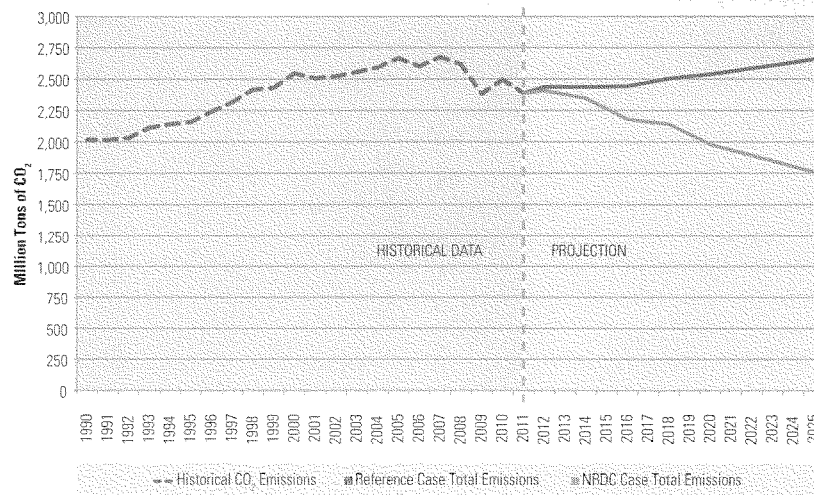


Improving energy efficiency also cuts costs to consumers and businesses. Switching to more efficient light bulbs, adding weather-stripping or insulation in buildings, or installing more efficient appliances and equipment, for example, can save a typical household more than \$700 per year—about one-third of the \$2,200 average annual utility bill.

Energy efficiency programs should include rigorous requirements to ensure that credited reductions in electricity use are real and verifiable. These requirements are addressed in the proposal.

The range of compliance options enables a 26 percent reduction in emissions of climate-change-causing CO₂ emissions from existing power plants by 2020 compared to 2005 levels (or equivalently, a 17 percent reduction compared to 2011 levels; see Figure 1: Generator Compliance: Illustrative Example; and Figure 2: Power Sector CO₂ Emissions Projections (Million Short Tons)).

States would have additional options. They could follow the EPA model program. They also would have the freedom to adopt alternative approaches—such as those already implemented in California and the Northeast States (through the Regional Greenhouse Gas Initiative)—as long as the states demonstrate those approaches will achieve equal or lower emissions.

Figure 2: Power Sector CO₂ Emissions Projections (Million Short Tons)

THE BENEFITS OF IMPLEMENTING THE PROPOSAL

NRDC asked ICF International to analyze the proposed approach using the company's proprietary Integrated Planning Model (IPM®). Used routinely by both the utility industry and regulators to determine cost-effective ways of meeting the nation's electricity needs and to assess the effects of regulations, the IPM® models the entire electric power sector. It integrates extensive information on power generation, fuel mix, transmission, energy demand, prices of electricity and fuel, environmental policies, and other factors.

For this analysis, NRDC made a series of conservative assumptions about fuel prices, energy demand, and policies to plug into the IPM®—and also assumed that new EPA rules limiting emissions of mercury, air toxics and further reducing sulfur dioxide and nitrogen oxides would be implemented.

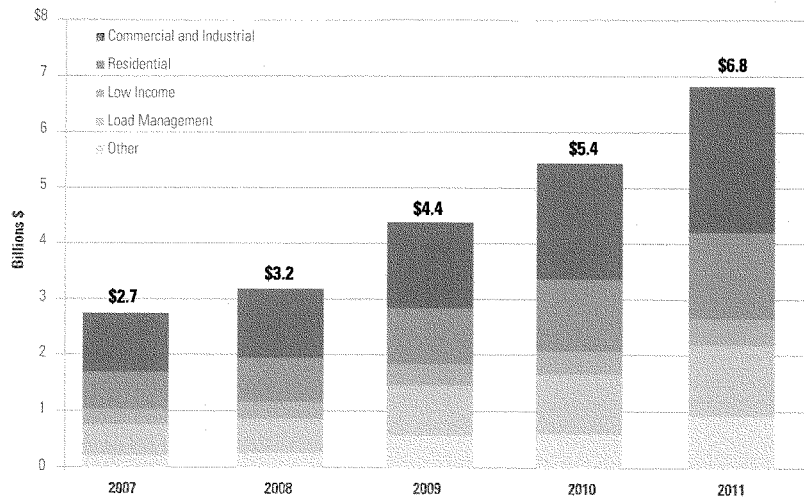
Modernizing the Electricity Sector

The results from the model show that the proposed approach would begin to modernize and clean up America's electricity sector while modestly *reducing* the nation's electricity bill. This is because energy efficiency programs adopted in response to the incentives created by the approach would cause overall demand to decline by 4 percent, rather than

increase by 7 percent. Meanwhile, coal-fired generation would drop 21 percent from 2012 to 2020 instead of increasing by 5 percent without the proposed carbon standard. Natural gas generation would rise by 14 percent, while renewables rise by about 30 percent (assuming no new state or federal policies to expedite an increase in market share for renewables).

Investments in energy efficiency and demand response are the lowest cost compliance pathway—much cheaper than building new power plants or installing pollution control equipment—so including this flexibility significantly reduces overall costs. Energy efficiency consistently delivers over three dollars in savings for every dollar invested, which is one of the many reasons utilities have scaled up annual investment from \$2.7 billion in 2007 to nearly \$7 billion in 2011, with a corresponding increase in energy savings. See Figure 3: U.S. Electric Efficiency Program Investments, 2007-2011.

Figure 3: U.S. Electric Efficiency Program Investments, 2007-2011

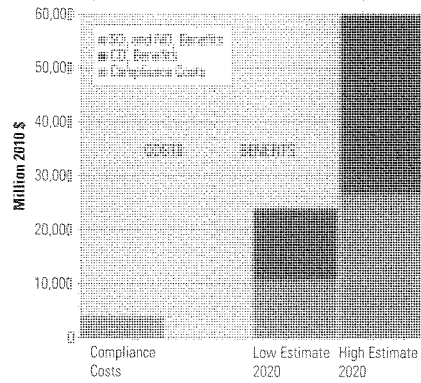


Source: CEE, 2011 State of the Efficiency Program Industry.

PAGE 5

Using the Clean Air Act to Sharply Reduce Carbon Pollution from Existing Power Plants, Creating Clean Energy Jobs, Improving Americans' Health and Curbing Climate Change

Figure 4: Estimated Costs and Benefits From Reductions in SO₂, NO_x, and CO₂ (2020)



Health and Environmental Benefits

The benefits of the proposal far outweigh the costs. Carbon dioxide from power plants contributes to the severity of heat waves, droughts, floods and rising sea levels, all of which bring an enormous toll in human lives, devastation and economic disruption. The value of reducing carbon pollution is estimated at \$25 to \$59 per ton, or more.

The proposal also brings cuts in emissions of traditional pollutants like sulfur and nitrogen oxides spewing from power plants beyond what current regulations would achieve. The emissions reductions delivered by implementing the proposal would prevent more than 23,000 asthma attacks, avoid more than 2,300 emergency room visits and hospital admissions per year and prevent thousands of premature deaths.

The benefits of reducing CO₂ and the traditional pollutants are both substantial, and add up to \$25 to \$60 billion. That's 6 to 15 times higher than the costs of complying with the proposal (see Figure 4: Estimated Costs and Benefits From Reductions in SO₂, NO_x, and CO₂ (2020)).

What's more, this approach would stimulate investments of more than \$90 billion in energy efficiency and renewables between now and 2020, boosting local and state economies. Establishing such CO₂ emission standards now will give the power industry the investment certainty it needs to avoid billions of dollars of stranded investment in obsolete power plants.



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Mr. WHITFIELD. Thank you, Mr. Hawkins.
And, Mr. Cichanowicz, you are recognized for 5 minutes.

STATEMENT OF J. EDWARD CICHANOWICZ

Mr. CICHANOWICZ. Chairman Whitfield, and members of the subcommittee, thank you for the opportunity to speak this morning. For more than 4 decades I have designed and tested environmental controls for fossil power stations. This morning I will summarize my opinion on the status of carbon capture and sequestration, and present a few graphics to show what the design challenges are.

CCS differs from all controls previously adopted to power stations to date. The amount of CO₂ removed from the gas stream is at least 15 times the amount of sulfur dioxide that is removed by flue gas desulfurization when using a high sulfur coal. The CO₂, once captured, in most cases must be transported at least dozens of miles, and the ultimate sink is well below the Earth's surface. All three of these steps have yet to be conducted at full scale on a coal-fired power station.

Let us look at a commercial design for one of the three options to control CO₂. Exhibit 1 shows the preliminary design of a 750 megawatt power station equipped with post-combustion control. This station was proposed, but not actually built. The equipment in red shows the boiler and steam turbine that produce the power. Encircled in green are the conventional controls for the emissions of sulfur dioxide, nitrogen oxides, particulate matter, and trace species, such as mercury. Encircled in blue is the CO₂ capture equipment. The array of towers on the right absorbs CO₂, and those on the left regenerate CO₂. What is noticeable is the size of the equipment. It is much larger than the conventional environmental controls. You can appreciate why it is important to get this design right, and get it right the first time.

The problem is that we have limited data from which to base a design, so we must do three things with our data. The first is to scale results from small pilots and early demonstrations to enable designing a large commercial unit. The second is to generalize results, or extend what we learned with one coal at one site to the variety of coals and sites that we will encounter around the U.S. And the third, most important, is to make sure that all the individual components work together.

Exhibit 2 helps explain a critical step in scaling. Exhibit 2 shows the largest pilot plant operating in the U.S. right now that is testing this particular process. It is at Alabama Power's Plant Barry. This pilot plant treats the gas flow equal to about 25 megawatts of capacity. The test towers for CO₂ absorption and regeneration are designed to look like the core, like an apple core, from a commercial reactor. So if we were designing a system for Exhibit 1 right now, we would scale this Barry pilot plant results by a factor of 37. For some steps, this is straightforward, and can be done with confidence, but for many steps, it cannot be done. There are two other methods to capture CO₂, the pre-combustion method that is used with gasified coal, and oxycombustion. I believe all three options, given time, have an equal chance to be commercially proven.

There are additional pilot plants and demonstrations coming on line in the next few years, but their numbers are few, and the re-

sults will take a while to acquire. Exhibit 3 shows a timeline of pilot plants, small commercial, and demonstration units that I think will influence CCS feasibility in the U.S. Most of these are in North America, but several are in Europe. The timeline shows the date when operations begin, and, on the vertical axis, it shows the size of the test or demonstration unit, in terms of the equivalent capacity.

I have included both pre-combustion and oxycombustion options on the chart, and these are distinguished by different symbols. I have also distinguished between projects that are operating or under construction. Those are the ones with the symbols filled in, which I understand you can't see real well, but they tend to be more in the lower left. The projects that are not yet financed are represented by the open symbols. Although the Great Plains Synfuels Unit has operated with pre-combustion control for years, we need to generalize results beyond the lignite fuel that it uses and the co-production of chemicals and power.

The final graphic highlights the utility demonstrations in the circle on the right. Exhibit 3 shows that only a few demonstration projects will be operating in the next several years. And, please, recognize the importance is not the start date, but the date when we acquire experience that we can use in coming up with a design, and that will be several years from startup.

There are equally challenging issues concerning CO₂ sequestration or re-use. These include, for example, the distribution of CO₂ sinks throughout the U.S., the predicted 5 to 10 year period to confidently map the details of the site, and the potentially confounding role of property rights. My written testimony further addresses these topics.

In summary, CCS, at some time in the future, may prove a feasible technology to control CO₂ emissions. In my opinion, we need until about 2020 to make this assessment with a reasonable degree of confidence. CCS is not commercially proven now. For it to be so, we need to populate that circle on the right with many more symbols, and the need to be closed, showing financed operating units not open.

Thank you for your time.

[The prepared statement of Mr. Cichanowicz follows:]

Testimony of
J. Edward Cichanowicz
Engineering Consultant

Saratoga, California

Before the
Subcommittee on Energy and Power
Committee on Energy and Commerce
United States House of Representatives

"Factors Affecting the Commercial Feasibility of Carbon Capture and Sequestration
Technologies for Coal-fired Power Stations"

November 14, 2013

SUMMARY

The U.S. Environmental Protection Agency (EPA) has proposed carbon dioxide (CO₂) limits for coal-fired power stations that require carbon capture and sequestration (CCS) technology. EPA's judgment that CCS technology is commercially proven is based on results from pilot-scale and demonstration tests, and experience with one commercial-scale unit located in the U.S. providing "co-production" of chemicals and power. In addition, EPA assumes storing CO₂ in depleted oil reservoirs – providing the benefit of enhanced oil recovery (EOR) – can be generalized nationwide.

In fact, meaningful experience is lacking with the three evolving CCS-related options: postcombustion control, precombustion control, and oxycombustion. These options have been tested at pilot plant and demonstration-scale, but no integrated processes operate dedicated to power generation. Although claims abound of experience, most are of limited relevance. For example, the CCS Institute in its *Global Status of CCS: 2013* notes twelve "large-scale" projects presently operate world-wide, but eleven address natural gas processing or chemical production, using equipment that is a fraction of the scale required for power generation.¹

We need additional demonstration-plant experience so we can design large, commercial-scale units for almost any coal, at almost any domestic U.S. site. We need to "scale" results, which means applying what we learn at small units (those 100 MW or less) to the design of typical base load units of 500 MW or more. We also need to "generalize" results, which means applying what we learn with one type of fuel at one site, to fuels and sites nationally. Further, we must assure components

¹ *The Global Status of CCS: 2013*, Global CCS Institute, Table A.3., page 162

that work as individual pieces at small-scale also will work in a system at large scale, while meeting a variable load.

There is no shortcut for acquiring this knowledge; demonstration and early commercial units must be financed, built, and tested for several years. At present only two test units are certain to operate in the U.S. by 2014. About six others are planned – including several in Europe, but financing for these six additional projects is not complete, leaving these projects at risk. One of the control options (precombustion) operates in the U.S. at commercial scale, but on one unique fuel, and in a chemical “co-production” mode with power.

CO₂ once captured must be safely sequestered or reused. Most of the proposed demonstrations or early commercial units plan to reuse CO₂ for EOR, which has a long history in the U.S. But assuming broad CCS application based on EOR restricts plant location and does not eliminate uncertainty. EOR sites are relatively limited. Absent EOR, the most prominent form of sequestration is within deep saline reservoirs. The capacity to store CO₂ in deep saline reservoirs is better distributed across the U.S. than for EOR, but still presents an uneven sink for CO₂ across all states.

Other challenges exist for both EOR and deep saline reservoirs. Characterization of subsurface formations is not complete. And both CO₂ fates require investment in infrastructure for pipeline delivery, and clarifying property right laws.

It is possible CCS can evolve to help mitigate CO₂ emissions, but that is dependent on the results of future demonstration tests, and field studies to clarify the uncertainties of EOR and sequestration. We do not know enough now to draw a conclusion. The work planned between now and 2020 must be completed, and supplanted by additional projects, to give CCS a chance of being commercially proven.

INTRODUCTION

Chairman Upton, Ranking member Waxman, and members of the Subcommittee, thank you for the opportunity to speak with you. Today I will present a brief overview of carbon capture and sequestration (CCS) and provide an example of the type of work being done to demonstrate these technologies. I will also present a timeline for major CCS demonstration projects - mostly in North America, but including several international efforts that may affect the commercial feasibility of CCS in the U.S.

Based on my experience in over 40 years of conducting research, demonstration, and testing of environmental controls for fossil fuels, I believe that we do not yet have sufficient experience by which to judge the commercial prospects of CCS. We will not have that experience until about 2020 – and that assumes that a sufficient number of demonstrations are actually funded, built, and provide us with data.

There does not appear to be a way to considerably shorten the time necessary to evaluate CCS processes under commercial conditions, without incurring significant risk. This risk would be manifested in terms of cost overruns to apply CCS and possibly compromise to reliability of a generating unit so equipped. I am not alone in this projection – it is generally consistent with the recent assessment of CCS issued by the Congressional Research Service.²

DESCRIPTION OF CARBON CAPTURE AND SEQUESTRATION METHODS

Carbon capture and sequestration, as the name implies, enables the capture of CO₂ and ultimate sequestration or storage - or where possible reuse for enhanced oil production. There is significant research and demonstration ongoing in this sector, which may eventually pay off to refine the technology. At present, there are three categories of CCS vying for near-term commercialization. These are:

Postcombustion control, which removes CO₂ from the products of fossil fuel combustion in conventional steam boilers. The process equipment is located following the conventional environmental control system, and typically employs a chemical reagent to capture CO₂.

Pre-combustion control, which removes carbon after coal is gasified into hydrogen and carbon monoxide, and after the energy in the carbon monoxide is transferred into more hydrogen. CO₂ oxidized from the carbon monoxide is separated from the hydrogen, and the latter is used in gas turbines for power.

Oxy-combustion, which is based on first separating the oxygen from air, and combusting fossil fuel in the nearly pure oxygen environment.

Each option has equal prospects to be successfully commercialized – that is, offered for sale with meaningful guarantees for performance and reliability. This criterion for commercialization – that CCS not just is offered for sale but also that it be backed up by meaningful guarantees – is required for success. The recent Congressional Research Service report on CCS acknowledged the importance of this distinction.³

Carbon capture is the first step – and responsible for 90% of the estimated cost for removing and sequestering CO₂. But it is not the sole task at hand. Once captured, CO₂ must be re-used or sequestered, where it is intended to reside for perpetuity. A widely discussed form of CO₂ storage is sequestration in deep saline aquifers, while the primary form of CO₂ re-use is enhanced oil recovery (EOR). Both CO₂ fates may in time prove viable – EOR has been used for decades. However, questions arise as to how these sites are distributed in the U.S., and how long it takes to fully characterize the subsurface geology.

² *Carbon Capture: A Technology Assessment*, prepared by the Congressional Research Service, October 21, 2013. Report 7-5700 R41325.

³ *Ibid.* Page 24.

For example, sequestration may not be feasible where surface and subsurface property rights are not clear. Although early results from the eight Regional Carbon Sequestration Partnerships suggest deep saline aquifers can safely store CO₂, the integrity of sequestration over long periods of time must be proven. And, measurement and verification methods to evaluate site integrity must continue to be refined.

RESEARCH AND DEMONSTRATION ACTIVITIES

Research and demonstration tests are underway to explore how to commercialize CCS for broad industry application. As will be discussed, success with CCS at any one facility or unique site conditions, although informative, does not assure broad availability across the U.S. To broadly apply CO₂ capture we must learn how to do three things. These are (a) scaling results from pilot plants and early demonstration units to a commercial size unit, (b) generalizing CCS design beyond the specific coal and site condition for any one test or demonstration, and (c) assuring components work together seamlessly. These lessons are elaborated as follows.

Scaling Design to Larger Capacities. The task of “scaling” the design from pilot plant or demonstration equipment to a large commercial generating unit must be addressed. Experience at small pilot plant capacities that are equivalent to 20-100 MW is invaluable, but we must know how to extend these lessons to larger sizes.

The size of postcombustion CO₂ capture equipment is indicated by Exhibit 1, which presents the conceptual design of a proposed coal plant employing postcombustion control. Exhibit 1 shows three categories of equipment that comprise this plant. First, encircled in red is the steam generator and turbine that generate power. Second, next to the steam generator and turbine - encircled in green - are environmental controls to limit emissions of nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter, and other species that are addressed by the Mercury and Air Toxics program.

The CO₂ capture equipment is the third category - within the blue circles. As shown in Exhibit 1, equipment both for absorption of CO₂ and regeneration of a concentrated byproduct is required.

Exhibit 1 represents a conceptual design of a 750 MW plant that was proposed but not built. In the U.S., the sole experience with postcombustion control is with the 25 MW-equivalent pilot plant at Alabama Power Company's Barry Station - shown in Exhibit 2. The pilot absorber tower is designed as an “apple core” in a commercial reactor - with the resulting data used to scale the design by a factor of 20 to support a 500 MW unit.

Exhibit 1 represents a conceptual design for one approach - postcombustion CO₂ control - and does not reflect pre-combustion or oxycombustion methods. The

latter two methods may differ from Exhibit 1 in the size of equipment and plant “footprint”, but they are equally complex and share the need for step-by-step demonstration.

Generalizing Design for Broad Application. Any one test or demonstration site is characterized by coal composition and site conditions which cannot readily be generalized to other fuels or sites. Extending design lessons from demonstration equipment to different fuels and sites is necessary to provide CO₂ capture technology on a broad national basis.

For example, coal composition – particularly inorganic material – can affect process chemistry. Success with a specific coal like lignite does not guarantee success for other widely used coals, such as eastern bituminous coals or coals from the Powder River Basin. Further, the content of chlorides and fluorides in coal is important as this affects corrosion, and the materials-of-construction necessary to resist corrosion. Other fuel factors such as volatility – the ease with which solid particles gasify when exposed to heat – is also important, particularly for the pre-combustion method.

Site characteristics, such as ambient temperature and humidity, and access to water for process equipment and cooling towers are features important to CCS performance.

In summary, generalizing equipment design for each of postcombustion, precombustion, and oxycombustion CO₂ control methods will require experience with at least the three “ranks” of coal used in the U.S., as well as various sites.

“Seamless” Operation of Components. A third precondition to any broad deployment of carbon capture is making sure the individual components work together in a seamless or integrated manner. Some observers note individual CCS components have been used successfully at small sizes in singular applications – equating this experience with demonstrated integrated design. However, CO₂ control processes must respond with the rest of the plant to meet a variable – and at times unpredictable – load, particularly in today’s competitive power markets.

Satisfying variable load requires not a collection of components but an integrated system. This task is as important as design of any individual component. In fact, the Global CCS Institute, in its recently released *Global Status of CCS: 2013*, note that “...the key technical challenge for widespread CCS deployment is the integration of component technologies into successful large-scale demonstration projects in new (emphasis added) applications such as power generation”⁴ Further, the International Energy Agency, in its *Technology Roadmap for Carbon Capture and Storage: 2013* states that “...although the individual component technologies required for capture, transport, and storage are generally well understood.....the

⁴ *The Global Status of CCS: 2013*, Global CCS Institute, page 10.

largest challenge for CCS deployment is the integration of component technologies into large-scale demonstration projects”.⁵

These lessons can only be learned with large-scale demonstration projects. For example, Sask Power’s Boundary Dam Unit 3 - equipped with a postcombustion CO₂ control and scheduled to start-up in early 2014 – employs 125 separate subsystems. Mississippi Power’s Kemper County unit – equipped with pre-combustion CO₂ capture designed for lignite coal- and also scheduled to startup in 2014 – employs an equally large number of subsystems never operated as one integrated design to exclusively serve power generation.

In summary, the need to scale, generalize, and integrate the operation of CO₂ capture processes requires large-scale demonstration.

TIMELINE FOR TESTING AND DEMONSTRATION INSTALLATION

Reviewing the timeline for pilot plant, demonstration, and early commercial application is instructive in understanding the state of commercial development.

Exhibit 3 depicts a timeline for pilot, demonstration, and early commercial tests that could affect CCS feasibility in the U.S. The start date is shown for each activity on the horizontal axis, and the size of the unit in terms of the equivalent generating capacity is shown on the vertical axis. Projects represented by symbols that are “closed” are operating or under construction, while “open” symbols reflect projects planned but not yet financed. Most of these test facilities are located in North America, but several are at facilities in Europe. Exhibit 3 shows for each test the date when the unit begins operation. This date - although noteworthy - is not the most important. Rather, progress is actually determined most by when results are available to deduce design principles. The date when design rules can be derived from experimental data is typically 2-3 years subsequent to the unit start date.

Exhibit 3 shows that with the exception of the Dakota Gasification Facility, operating experience on large units does not accrue until about 2017-2018. In 2014 Sask Power’s 110 MW Boundary Dam Unit 3 begins operating with postcombustion control, and Mississippi Powers’ Kemper County with pre-combustion control. These units, being first-of-a-kind, may not produce useful data in the first months of operation. It is possible 6-12 months may be required to “shake down” the process equipment, eliminate operating “bugs”, and begin to accrue data.

The duration of tests cited in Exhibit 3 varies significantly. Several small postcombustion processes that capture CO₂ for use on-site (e.g. not requiring transport for sequestration or reuse) have operated for 10 years (Warrior Run, Shady Point, Searles Valley Minerals). Two small (10-30 MW-equivalent)

⁵ *Technology Roadmap: Carbon Capture and Storage: 2013 Edition*, The International Energy Agency, 2013. See page 5.

oxycombustion pilot plants (Calide, Lacq) operated for 2 years, while the Vattenfall oxycombustion pilot plant will operate for a decade to derive adequate experience.

Exhibit 3 suggests commercial design data may start to be available around 2017 and 2018 – but results will be limited in scale and scope. There are no large postcombustion CO₂ demonstrations planned for any of the three U.S. coal ranks (lignite, eastern bituminous, subbituminous); only the 25 MW Plant Barry pilot plant provides data. Experience with oxycombustion control will emerge from the Department of Energy (DOE) sponsored FutureGen project by about 2019. Although several helpful projects are planned, the financing for them is not complete (e.g. open symbols).

In summary, Exhibit 3 shows that by 2020 a limited number of demonstrations will be available from which to derive design rules.

CO₂ REUSE OR SEQUESTRATION

Equally important to the capture of CO₂ is the ultimate fate of the CO₂ – where to put it once removed from the gas stream. The reuse of CO₂ for EOR is one possible long-term fate. CO₂ has been used to increase production of oil or gas in partially depleted reservoirs for decades. However, the ability for EOR to broadly supply CO₂ sinks for coal-fired generation across the entirety of the U.S. is not apparent – the largest sites are concentrated in a limited number of states. The pipeline network to deliver CO₂ from around the U.S. to these sites must be expanded. The technical challenges to expanding the pipeline network can be overcome, but it may be harder to address several non-technical issues, including property rights, right-of-way, and the conflicting laws and rules of multi-state jurisdictions.

The alternative to EOR – sequestration in deep saline reservoirs – also offers potential to store CO₂. The DOE estimates significant capacity to store CO₂ in deep saline reservoirs, and reports deep saline “sinks” for CO₂ are more uniformly distributed than sites for enhanced oil recovery. Similar to EOR, there are important non-technical issues, mostly related to property rights.

Three aspects of property rights are important: (1) acquisition of pore space for storage over a broad area; (2) right-of-way to construct transport pipelines; and (3) access to the surface for monitoring.

Subsurface lands with the desired pore space can be privately owned, and CO₂ injection can impact owners in multiple states. Historically, the laws governing access to oil and gas fields from multiple owners – addressing compulsory unitization and eminent domain – may be inadequate for CO₂ injection.

CO₂ repositories must be extensive and due to their size could infringe on existing minerals, water, and private property rights (both surface and subsurface). Repositories located across state lines will introduce jurisdictional questions –

particularly if CO₂ plumes migrate. CO₂-derived liabilities are not fully defined and there is little basis for resolving disputes. Further complicating the issue of how to address long-term CO₂ fate is the time frame for monitoring and responsibility for sequestration, which extends well beyond that typical for oil/gas experience.

In summary, the potential to permanently isolate CO₂ by EOR or sequestration exists, but uncertainties remain. Candidate sites for sequestration or EOR must be extensively studied to assess their feasibility – the International Energy Agency estimates 5 to 10 years to qualify a saline reservoir as adequate.⁶ The DOE National Energy Technology Laboratory (NETL) Regional Partnerships address these questions through eight large-scale field studies, but all have operated for a relatively short period of time.⁷ Similar to the CO₂ capture step, completing these and additional field studies is needed.

CCS: WHEN PROVEN?

Several organizations describe demonstration and commercialization goals for CCS for 2020. That these organizations publicly define a commercialization goal for 2020 is significant – it implies CCS at present is not commercially proven, and that a series of steps are required to be so proven. Whether or not CCS will be successfully demonstrated by 2020 remains to be seen – but three of the following “roadmaps” imply it is not demonstrated at present.

Specifically, the International Energy Agency (IEA) in its recently released *Technology Roadmap: Carbon Capture and Storage – 2013 Edition* recommended for 2020 that “...the capture of CO₂ is successfully demonstrated in at least 30 projects across many sectors....”⁸ The document also presents an Action 2, which advises governments to “develop national laws and regulations as well as provisions for multilateral finance that effectively require new-build, base-load, fossil-fuel power generation capacity to be CCS-ready”.⁹ The provision that new-build plants be CCS-ready is in contrast to requiring that new-build plants be equipped with CCS.

The U.S Department of Energy’s National Energy Technology Laboratory’s most recent *Carbon Dioxide Capture and Storage RD&D Roadmap* identified a DOE goal of “.....having an advanced CCS technology portfolio ready by 2020 for large-scale demonstration that provides for the safe, cost-effective carbon management that will meet our Nation’s goals for reducing GHG emissions”.¹⁰ The Roadmap further

⁶ Ibid. Page 17.

⁷ *The United States 2012 Carbon Utilization and Storage Atlas*, Department of Energy, page 8.

⁸ *Technology Roadmap: Carbon Capture and Storage: 2013 Edition*, The International Energy Agency, 2013. See page 23.

⁹ Ibid. See page 28.

¹⁰ *DOE/NETL Carbon Dioxide Capture and Storage RD&D Roadmap*, December 2010, page 3; also Figure 1-10 timeline on page 12.

calls out completing by 2020 “full-scale demonstrations of advanced oxy-combustion and post-combustion CO₂ capture technologies”.¹¹

In April of 2012 the UK Ministry for Energy and Climate Change issued a *CCS Roadmap*, which stated “Our aim is to enable industry to take investment decisions to build CCS equipped fossil power plant in the early 2020s.”¹² This document further describes a CCS Commercialization Programme, which states an objective of “.....reducing the cost of CCS so that it can be deployed in the early 2020s”.¹³

CONCLUSION

CCS technology could eventually be a viable option to limit CO₂ emissions from coal-fired power stations. At present, the technology is not commercially proven to allow broad application in the U.S.

For CO₂ capture, additional demonstrations are necessary to enable design of large commercial systems that can be provided with meaningful guarantees. The work to date has contributed to a basic understanding of the processes, but is inadequate to formulate a reliable design for large units.

Sequestering CO₂ for extended periods of time is uncertain. Barriers must be addressed prior to broad application. Subsurface geology must be mapped. Uncertainties in property rights in many states must be clarified. And, the long-term fate of injected CO₂ – to be safely sequestered – must be verified, along with monitoring techniques. Significant investment in pipeline infrastructure will be required. There may be fewer uncertainties with EOR, but these sinks for CO₂ are not broadly distributed. Both pipeline infrastructure and the geologic mapping of depleted fields must be expanded.

Without additional demonstrations and field tests, significant risk for failure exists. These risks will be manifested in terms of higher costs, a compromise to reliability, or both.

¹¹ Ibid. Page 12, Table 1-1.

¹² *CCS Roadmap: Supporting Deployment of Carbon Capture and Storage in the UK*, April 2012, page 5.

¹³ Ibid, page 26.

EXHIBIT 1

Conceptual Design of Coal-Fired Power Plant Equipped with Postcombustion
Carbon Capture (Source: Tenaska Trailblazer)

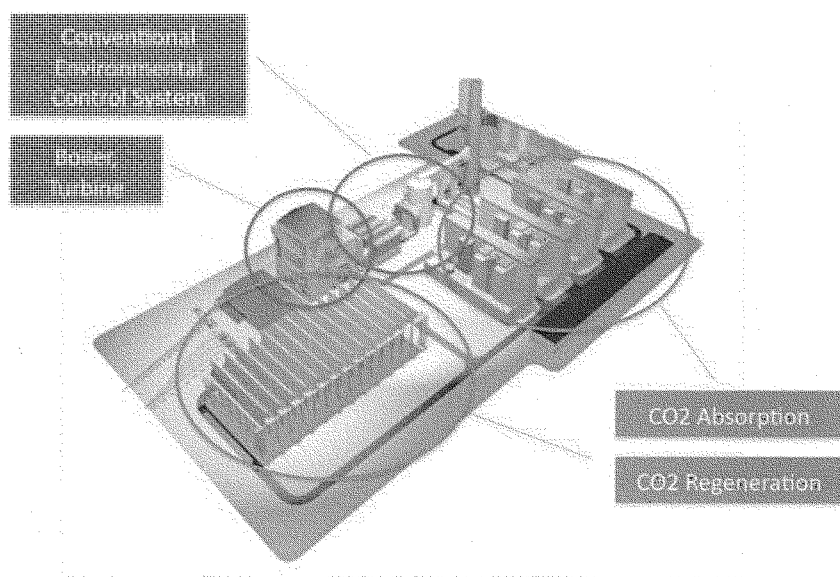


EXHIBIT 2

25 MW-Equivalent Postcombustion CO₂ Pilot Plant
at Alabama Power Plant Barry (2012+)

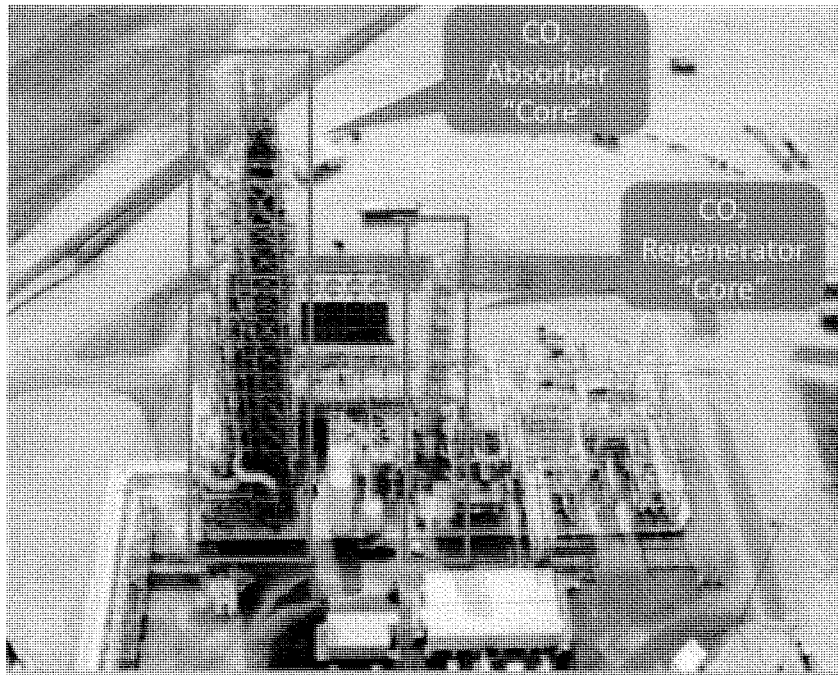
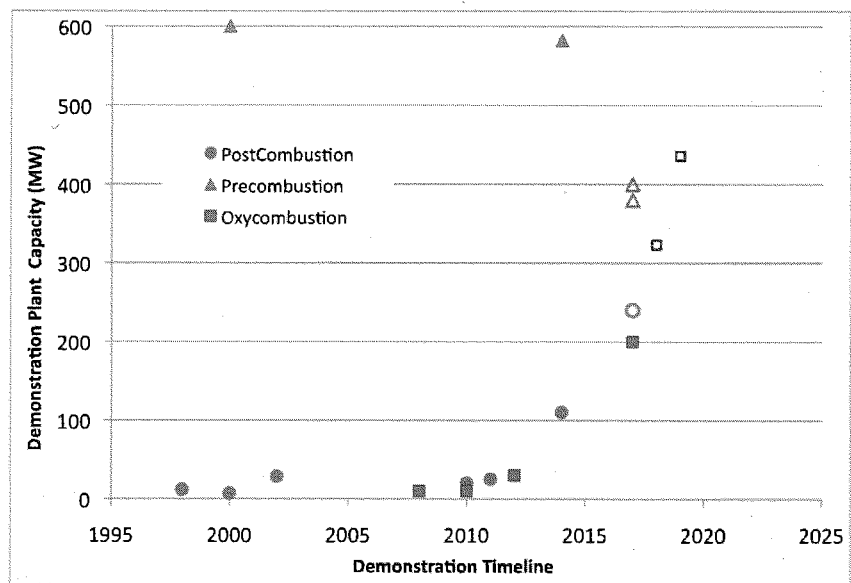


EXHIBIT 3

CCS PILOT PLANT AND DEMONSTRATION TIMELINE
Operating/Construction: Solid Symbols Planned: Open Symbols



Mr. WHITFIELD. Thank you very much.

And, Dr. van der Vaart, you are recognized for 5 minutes.

STATEMENT OF DONALD R. VAN DER VAART

Mr. VAN DER VAART. Good morning, Chairman, and members of the committee. I am with the State of North Carolina. Thank you for the——

Mr. WHITFIELD. Your microphone——

Mr. VAN DER VAART. Sorry. I am with the State of North Carolina, and I appreciate the opportunity to testify today. Before I comment on the specifics of EPA's use of Section 111 of the Act, I wanted to note issues that my comments will not address.

First, my comments are not about the scientific uncertainty of the impact anthropogenic greenhouse gas emissions have on climate. My comments do not address the accuracy or inaccuracy of the IPCC models relied upon by the EPA, or the divergence between the models' predictions and the actual temperatures over the past 15 years. These issues are critical to any decision on whether, in the absence of Congressional authorization, the EPA should regulate greenhouse gas emissions from stationary sources.

Against this background, I offer three specific concerns about EPA's current actions to regulate greenhouse gas emissions from fossil fuel fired electric generating units. First, EPA is required by Congress to base any new source performance standard on the best system of emission reductions that the Administrator determines has been adequately demonstrated. The EPA has recently proposed NSPS for utility units, assumed carbon capture and storage, or CCS, has been adequately demonstrated. One need only look at the yet to operate Kemper County Energy Facility in Mississippi, with its substantial governmental funding, as *prima facie* evidence that the EPA's conclusions are unsupported.

Even if a state is blessed with the requisite geologic formations, facilities would be required to build miles of pipeline simply to reach the formation. EPA's proposed approach will pit the reliability of this nation's electricity supply against the considerable uncertainty of environmental permitting of these pipelines, superimposed on an unproven technology of CCS. Sound science, rather than speculation, should drive environmental regulation.

Second, the traditional function of Section 111 was to protect, or grandfather, existing facilities to prevent their migration to less polluted areas of the country. The 1990 amendments to 111(d) were true to this tradition by prohibiting the overlap of 111(d), for existing sources, with two other programs in the Act. Section 111(d) prohibits EPA from regulating pollutants from source categories regulated under Section 112. In 2011, EPA issued regulations under Section 112 applicable to fossil fuel fired electric generating units, thereby foreclosing regulation under Section 111(d).

In the past, EPA has suggested that there is a conflict in the statutory language of Section 111(d) with regard to whether the 112 prohibition was pollutant specific or source category specific. This is a false choice, as there is no internal conflict in Section 111(d). Prior to 1990, Section 112 was pollutant specific. In 1990, the structure of Section 112 was changed from one that regulated pollutants to one that regulated source categories. To prevent over-

lap with the newly structured 112 program, 111(d) was augmented to exclude not only Section 112 pollutants, but also Section 112 regulated source categories. The two exclusions are entirely self-consistent, and should not be used to invoke Chevron deference.

Section 111(d) also prohibits regulating pollutants listed under Section 108. A pollutant must be listed under Section 108 when three criteria are satisfied. Those criteria were satisfied when EPA published its endangerment finding under Section 202. While North Carolina takes no position on whether EPA should establish NAAQS for greenhouse gases, all of the conditions necessary to list greenhouse gases under Section 108 have already been met. The listing in itself prohibits EPA from regulating greenhouse gas emissions under Section 111(d). Indeed, EPA may already be under a pre-existing non-discretionary duty to issue criteria and simultaneously propose a natural ambient air quality standard for greenhouse gases.

Finally, in the case where EPA does have authority to establish emission guidelines under Section 111(d), that authority is limited. EPA is not authorized to impose emission standards on existing sources. Rather, EPA can only establish a unit specific guideline that describes what control technologies have been demonstrated. Once EPA provides that guideline, Section 111(d) allows states to develop unit specific emission standard after considering many factors, including the cost, physical constraints on installing controls, and the remaining useful lifetime of the emission units.

The plain language of the Act, as well as the legal precedent, precludes EPA and states from designing a standard that relies on reductions made outside of the emission unit. Any flexibility in compliance with a standard based on a specific emission standard resides with the states, who have the primary responsibility for implementation of this program.

Thank you.

[The prepared statement of Mr. van der Vaart follows:]

**Testimony before the
House Committee on Energy and Commerce
Subcommittee on Energy and Power
“EPA’s Proposed greenhouse gas emissions Standards for
New Power Plants and H.R. __, Whitfield-Manchin
Legislation.”**

November 14, 2013

**Donald R. van der Vaart, Ph.D, P.E., J.D.
North Carolina Department of Environment
and Natural Resources**

Statement of
Donald R. van der Vaart, Ph.D., P.E., J.D.
North Carolina Department of Environment and Natural Resources
November 14, 2013

Summary of Testimony

Legal Issues – There are serious questions concerning EPA’s authority to regulate greenhouse gas emissions from stationary sources under the Clean Air Act (Act). Rather than pursuing its duty under section 108 of the Act, EPA appears to be following a course pursuant to section 111 of the Act to regulate greenhouse gas emissions from stationary sources. Under section 111(b) EPA is proposing a standard for new sources that does not meet the requirements of the law. Additionally, EPA seeks to regulate existing sources under authority that does not exist in section 111(d).

Technical Issues – EPA’s current proposal to regulate new fossil fuel-fired electric utility units under section 111(b) of the Act is based on their finding that carbon capture and sequestration (CCS) has been adequately demonstrated. CCS has not been adequately demonstrated. There is continuing uncertainty with respect to the application of this technology on this scale as well as continued concerns about the availability of geologic formations for sequestration.

Implementation Issues – EPA’s contemplated approach to regulate greenhouse gas emissions from existing fossil fuel-fired electric utility units under Act section 111(d) raises serious concerns about the roles of the federal and state governments in implementing air pollution control programs. The Act charges the States - not EPA - with the responsibility to develop and implement air pollution control programs. Any EPA regulatory action designed to address

greenhouse gas emissions from fossil fuel-fired utility units should acknowledge and respect this cooperative federalism and allow States the ability to define the requirements for sources located within their States.

**Testimony before the
House Committee on Energy and Commerce
Subcommittee on Energy and Power**

**Statement of
Donald R. van der Vaart, Ph.D., P.E., J.D.
North Carolina Department of Environment and Natural Resources
November 14, 2013**

Good morning Chairman and members of the Committee, I am Donald van der Vaart, with the North Carolina Division of Air Quality. I am here on behalf of John Skvarla, the Secretary of the North Carolina Department of Environment and Natural Resources. Thank you for the opportunity to testify today.

I would note that the Clean Air Act (Act) specifically provides that States – not the EPA – “have the primary responsibility” for implementing programs that protect the air resources of this Nation. It is an indisputable fact that States, like North Carolina, have been very successful over the past 30 years implementing programs that protect public health and welfare while providing for economic development.

Before I comment on the specifics of EPA’s use of section 111 of the Act I wanted to note issues that my comments will not address. First, my comments are not about the scientific uncertainty of the impact anthropogenic greenhouse gas emissions have on climate. My comments do not address the accuracy or inaccuracy of the IPCC models relied upon by EPA or the divergence between the models’ predictions and actual temperatures over the past 15 years. These issues are critical to any decision on whether, in the absence of Congressional authorization, EPA should regulate greenhouse gas emissions from stationary sources.

Against this background I offer three specific concerns about EPA's current actions to regulate greenhouse gas emissions from fossil fuel-fired electric generating units.

First, EPA is required by Congress to base any New Source Performance Standard (NSPS) on the best system of emission reductions that "the Administrator determines has been adequately demonstrated." EPA's recently proposed NSPS for utility units assumed carbon capture and storage – or CCS – has been "adequately demonstrated." One need only look at the yet to operate Kemper County Energy Facility in Mississippi, with its substantial governmental funding, as prima facie evidence that EPA's conclusions are unsupported. In addition to the fact that there is not a single fossil fuel-fired utility plant operating with CCS, EPA themselves acknowledged geologic sequestration is not generally available at the emission units themselves. Even if a State is blessed with the requisite geologic formations, facilities would be required to build miles of pipelines simply to reach the formation. EPA's proposed approach will pit the reliability of this nation's electricity supply against the considerable uncertainty of environmental permitting of these pipelines superimposed on the unproven technology of CCS. Sound science, rather than speculation should drive environmental regulation.

Second, section 111(d) prohibits the overlap of 111(d) with two other programs in the Act. Section 111(d) prohibits EPA from regulating pollutants from source categories regulated under sections 112. In 2011 EPA issued regulations under section 112 applicable to fossil fuel-fired electric generating units thereby foreclosing regulation under section 111(d). In the past EPA has suggested that there is a conflict in the statutory language of section 111(d) with regard to whether the 112 prohibition was pollutant specific or source category specific. This is a false choice as there is no internal conflict in section 111(d). Prior to 1990, section 112 was a

pollutant-specific program. In 1990 the structure of section 112 was changed from a program that regulated *pollutants* to one that regulates *source categories*. To prevent overlap with the newly structured 112 program 111(d) was augmented to exclude not only section 112 pollutants, but also section 112 regulated source categories. The two exclusions are entirely self-consistent and should not be used to invoke *Chevron* deference.

Section 111(d) also prohibits regulating pollutants listed under section 108. A pollutant must be listed under section 108 when three criteria are satisfied. Those criteria were satisfied when EPA published its endangerment finding under section 202. While North Carolina takes no position on whether EPA should establish a NAAQS for greenhouse gases, all of the conditions necessary to list greenhouse gases under section 108 have already been met. The listing in itself prohibits EPA from regulating greenhouse gas emissions under section 111(d). Indeed, EPA may already be under a pre-existing, non-discretionary duty to issue criteria and simultaneously propose a National Ambient Air Quality Standard for greenhouse gases.

Finally, in cases where EPA does have the authority to establish emission guidelines under section 111(d), that authority is limited. EPA is not authorized to impose emissions standards on existing sources. Rather, EPA can only establish a unit-specific guideline that describes what control technologies have been demonstrated. Once EPA provides that guideline, section 111(d) allows States to develop unit specific emission standards after considering many factors including the cost, physical constraints on installing controls, and the remaining useful life of the emission units. The plain language of the Act as well as legal precedent precludes EPA and States from designing a standard that relies on reductions made outside of the emissions unit.

Any flexibility in compliance with a standard based on a specific emission unit resides with the States who have the primary responsibility for implementation of this program.

Thank You.

Mr. WHITFIELD. Thank you very much.
And, Mr. Eisenberg, you are recognized 5 minutes.

STATEMENT OF ROSS E. EISENBERG

Mr. EISENBERG. Thank you. Good afternoon, Mr. Chairman. Members of the subcommittee, thank you for having me today, on behalf of the NAM.

We are at a crossroads on energy and climate. Our nation is truly awash of every single type of energy, be it oil, gas, coal, nuclear, renewables, energy efficiency. This robust all of the above portfolio and policy, and our commitment to it, is helping fuel a manufacturing resurgence in this country. It is a good thing.

However, the very same government that is presiding over this, and is benefitting from this, is perilously close to enacting policies that would stop us from using most of this energy, and many of these decisions would be irreversible, and could limit manufacturers' long term competitiveness.

Now, manufacturers are committed to protecting the environment through greater environmental sustainability, increased energy efficiency and conservation, and by reducing greenhouse gas emissions. We believe that policies to reduce greenhouse gases, whether legislative or regulatory, must be done in a thoughtful, deliberative manner, and transparent process that ensures a competitive, level playing field for U.S. companies in the global marketplace. And it should focus on cost effective reductions, be implemented in concert with all major emitting nations, and take into account all relevant greenhouse gas sources and sinks.

Unfortunately, our government has settled on a climate policy that really meets none of these objectives, regulation under the Clean Air Act. But as inflexible and unforgiving as the Act tends to be with respect to greenhouse gases, many of the choices that EPA is making to implement the Act for greenhouse gases are equally problematic.

We know, from the President's Climate Action Plan, that he believes the only way to reduce greenhouse gases in the U.S. is to stop using fossil fuels. We disagree. We believe that we can use fossil fuels, while also innovating and manufacturing the technologies needed to limit the resulting emissions. However, EPA's greenhouse gas NSPS regulation set us on a clear path toward elimination, and nothing else. And so what really should be a policy on climate winds up looking suspiciously like a means to an end.

The standard for new power plants bans conventional coal-fired power, based on EPA's assertion that partial CCS has been adequately demonstrated, taking into account costs and energy requirements. We know this isn't true. We have talked about it a lot today. While we believe CCS holds great promise as a technology, and should happen, it is simply not ready to be deployed the way the EPA insists it will be in the near term. And because it is not commercially available, this, and all future NSPS for greenhouse gases are essentially a line drawing exercise in what energy we can and we can't use. Right now EPA is drawing that line to eliminate coal, and to allow everything else. But these standards are reviewable every 8 years, which means 8 years from now EPA will be redrawing that line, and the same arguments being used to crowd

out coal today could very well be used to do the exact same thing to natural gas.

Regulations that result in the limitation of coal or gas could pose serious problems for manufacturers. Coal was responsible for 37 percent of our nation's electricity in 2012, followed by gas, at 30 percent. These fuels will remain the dominant sources of energy in the U.S. for many years, and the nexus is even more profound at the state level. States where manufacturing is heaviest, places like Indiana, Michigan, Louisiana, Kentucky, Kansas, Pennsylvania, Ohio, they use a lot of coal, and they use a lot of natural gas.

And so now EPA is going to have to draw that line not only on the new fleet, but on the existing fleet of power plants in a little more than 6 months. Then it will have to do it for other industrial sectors, like refineries and chemical manufacturing, natural gas drilling, iron and steel, aluminum, cement, pulp and paper, glass, food processing, and many others. That is why we frequently say that manufacturers will be hit twice by these regulations, both as users of the energy being regulated, and as industries considered next in line to receive similar regulations from EPA on their own plants.

And that is why the choices EPA is making in this rule matter. The legal issues, like when a technology is adequately demonstrated, and what constitutes significant endangerment, matter beyond just this rule, because every sector has a stretch technology that doesn't make a lot of financial sense right now, but would theoretically reduce emissions. So is this now what NSPS is going to require for each of them?

Now, I suspect that the members of this subcommittee, both Republican and Democrat, would prefer that EPA take a different approach to greenhouse gases than it has done so far. I still believe you can do something about it. We at NAM support the Whitfield-Manchin bill, which allows the EPA to regulate greenhouse gases, but ensures that the regulations are done smarter and better.

Now, opponents are calling this a repeal bill. That is not true. This bill doesn't repeal anything. For new power plants, it requires separate standards for coal and gas, with sub-categorization. It provides a reasonable path forward for CCS, which allows the EPA to require it, but only when it is truly ready. And, finally, it allows the EPA to craft rules or guidelines for existing power plants. It doesn't stop them from doing it. It just gives Congress a say over when they are OK, and when they can say go.

The Whitfield-Manchin bill, at the end of the day, would give manufacturers regulatory certainty by preserving an all of the above policy. Had the proposed rule that we are discussing today looked like that portion of the Whitfield-Manchin bill, I think we are having a different conversation. By enacting this bill, Congress can steer the EPA toward an end result that accomplishes long term meaningful reductions in greenhouse gas emissions, while preserving a health and robust manufacturing sector.

Thanks. I look forward to your questions.

[The prepared statement of Mr. Eisenberg follows:]

Testimony of Ross Eisenberg
Before the House Committee on Energy and Commerce
Subcommittee on Energy and Power
Hearing on: "EPA's Proposed GHG Standards for New Power Plants and H.R. __,
Whitfield-Manchin Legislation"
November 14, 2013

The National Association of Manufacturers (NAM) and our member companies are committed to protecting the environment through greater environmental sustainability, increased energy efficiency and conservation and reducing greenhouse gas (GHG) emissions. The NAM believes the establishment of federal climate change policies to reduce GHG emissions, whether legislative or regulatory, must be done in a thoughtful, deliberative and transparent process that ensures a competitive level playing field for U.S. companies in the global marketplace. Any climate change policies should focus on cost-effective reductions, be implemented in concert with all major emitting nations, and take into account all GHG sources and sinks.

Unfortunately, our government has settled on a climate policy that meets none of these objectives: regulation under the Clean Air Act. While over the years there have been a wide range of legislative and regulatory proposals to address GHG emissions, it is impossible to ignore the harsh reality that *this* policy—the one we have chosen—could be both the most expensive and least environmentally effective of them all.

In his Climate Action Plan, the President makes abundantly clear that in his view, the only way to reduce GHG emissions in the United States is to stop using fossil fuels. We disagree. Manufacturers have demonstrated we can use fossil fuels while also innovating and manufacturing the technologies needed to limit the resulting GHG emissions. If the EPA regulates one or more of these fuels out of the economy, we lose not only the advantages provided by the energy itself but also the opportunity to own the next generation of energy technologies.

The NAM is deeply concerned with the decisions EPA has made in the rule for future power plants and fears that the agency is heading down a path toward a costly, unworkable set of standards for existing power plants and other industrial sectors. Manufacturers ultimately will be hit twice by the EPA's GHG regulations—both as users of the energy being regulated and as industries considered "next in line" to receive similar regulations from the EPA for their own plants. A poorly crafted rule on existing power plants that results in the limitation of coal or natural gas could pose serious problems for manufacturers, because these fuels will remain the dominant sources of energy in the United States for many years. The nexus between coal, natural gas and manufacturing is even more pronounced when viewed at the state level in places like Indiana, Louisiana, and Ohio.

Given the impact these regulations could have on energy reliability and costs, and the precedent they could set for future regulations for other sectors, we ask that Congress at least make these regulations more reasonable. Manufacturers support the bill from Rep. Ed Whitfield (R-KY) and Sen. Joe Manchin (D-WV) being discussed at today's hearing, which would allow the EPA to regulate GHGs but would ensure that these regulations are done in a manner that protects a true "all-of-the-above" energy strategy. By enacting the Whitfield-Manchin bill, Congress can steer the EPA toward an end result that accomplishes long-term meaningful reductions in GHG emissions while preserving a healthy and robust manufacturing sector.



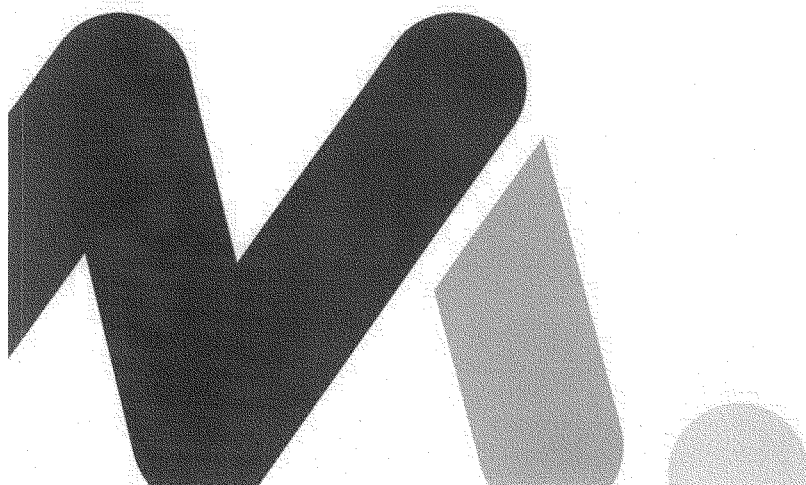
Testimony

of Ross Eisenberg
Vice President
Energy and Resources Policy
National Association of Manufacturers

*before the House Committee on Energy and Commerce
Subcommittee on Energy and Power*

*on "The EPA's Proposed GHG Standards for New Power Plants and H.R. ____,
Whitfield-Manchin Legislation"*

November 14, 2013



**TESTIMONY OF ROSS EISENBERG
BEFORE THE HOUSE COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND POWER**

Hearing on:
“The EPA’s Proposed GHG Standards for New Power Plants and H.R. ____,
Whitfield-Manchin Legislation”

NOVEMBER 14, 2013

Good morning, Chairman Whitfield, Ranking Member Rush and members of the Subcommittee on Energy and Power. My name is Ross Eisenberg, and I am vice president of energy and resources policy at the National Association of Manufacturers (NAM). The NAM is the nation's largest industrial trade association, representing nearly 12,000 small, medium and large manufacturers in every industrial sector and in all 50 states. I am pleased to represent the NAM and its members at today's hearing on the Environmental Protection Agency's (EPA) greenhouse gas (GHG) regulations for power plants and legislation that would make these regulations more reasonable.

We are at a crossroads on energy and climate. For the first time in our nation's history, we are truly awash in every single type of energy, be it oil, gas, coal, nuclear, renewables or energy efficiency. This robust “all-of-the-above” energy portfolio, and our commitment to it, is helping fuel a manufacturing resurgence in the United States.

However, as one hand giveth, the other taketh away. The same government that is benefiting—politically and economically—from this energy

boom is perilously close to enacting a set of policies that would stop us from using most of this energy. Many of these decisions would be irreversible and could limit manufacturers' long-term competitiveness.

The NAM and our member companies are committed to protecting the environment through greater environmental sustainability, increased energy efficiency and conservation and by reducing GHG emissions. Led by manufacturers' innovations in energy development and efficiency, U.S. GHG emissions are as low today as they were in the mid-1990s—this while manufacturing gross output has increased 29 percent.¹ Even more remarkable is that these emissions reductions have taken place while China—the world's largest emitter—has seen emissions more than double over that same time period.²

However, we know the United States cannot solve the climate change issue alone. GHGs collect in the atmosphere indiscriminate of the location of the emission source. Thus, one ton of carbon dioxide (CO₂) emitted in California or Rhode Island has the same impact as one ton emitted in China or India. If the United States were to act without the majority of the GHG emitting world, production that once occurred in the United States would very likely be replaced by production in parts of the world with weaker environmental policies, resulting in limited or no net GHG reductions. The NAM, therefore, believes the establishment of federal climate change policies to reduce GHG emissions,

¹ U.S. Bureau of Economic Analysis.

² The International Energy Administration (IEA) estimates that U.S. CO₂ emissions—the most prevalent GHG—were 5,482 million metric tonnes (t) in 1997 and 5,368.6 t CO₂ in 2010. The IEA estimates China's CO₂ emissions were 3,196 t CO₂ in 1997 and 7,258 t CO₂ in 2010. Preliminary data indicate that U.S. emissions were even lower in 2011 and 2012.

whether legislative or regulatory, must be done in a thoughtful, deliberative and transparent process that ensures a competitive level playing field for U.S. companies in the global marketplace. Any climate change policies should focus on cost-effective reductions, be implemented in concert with all major emitting nations and take into account all greenhouse sources and sinks.

Unfortunately, our government has settled on a climate policy that meets none of these objectives: regulation under the Clean Air Act (CAA). The CAA was never designed to apply to GHGs, and its own author has acknowledged that attempting to do so would create a “glorious mess” that reverberates through the economy.³ While over the years there have been a wide range of legislative and regulatory proposals to address GHG emissions, it is impossible to ignore the harsh reality that *this* policy—the one we have chosen—could be both the most expensive and least environmentally effective of them all.

President Obama has directed the EPA to issue these regulations, and we expect the agency will move forward. Manufacturers ultimately will be hit twice by the EPA's GHG regulations—both as users of the energy being regulated and as industries considered “next in line” to receive similar regulations from the EPA for their own plants. Given the impact these regulations could have on energy reliability and costs, and the precedent they could set for future regulations for other sectors, we ask that Congress at least make these regulations more reasonable. Manufacturers support the energy bill from Rep. Ed Whitfield (R-KY) and Sen. Joe Manchin (D-WV) being discussed at today's hearing, which would

³ U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Energy and Air Quality, “Strengths and Weaknesses of Regulating Greenhouse Gas Emissions Using Existing Clean Air Act Authorities,” statement of Chairman John D. Dingell (D-MI), 10 April 2008.

allow the EPA to regulate GHGs but would ensure that these regulations are done in a manner that protects a true "all-of-the-above" energy strategy. We urge the members of this Subcommittee to do the same.

I. **The EPA's GHG New Source Performance Standards and Their Impact on Manufacturers**

New Power Plants

On June 25, 2013, President Obama issued an executive memorandum directing the EPA to issue New Source Performance Standards (NSPS) under Section 111(b) of the Clean Air Act to apply to GHG emissions from future power plants. The EPA released this proposed rule on September 20, 2013, and is taking public comment. The EPA's proposed rule requires all new coal-fired power plants to meet a standard of 1,100 lbs. CO₂ per megawatt-hour (MWh) and all new natural gas-fired power plants to meet a standard of either 1,000 lbs. CO₂/MWh (for larger units) or 1,100 lbs. CO₂/MWh (for smaller units). Practically speaking, this means no new coal-fired power plant can be built unless it includes partial carbon capture and sequestration (CCS) technologies, and no new natural gas-fired power plant can be built unless it is a natural gas combined cycle (NGCC) unit. Because CCS is neither commercially available nor cost effective for a utility-scale power generation project, the rule effectively bans the construction of any coal-fired power plant going forward.

Manufacturers are deeply concerned with the EPA's decisions in the rule for future power plants and fear that the agency is heading down a path toward a costly, unworkable set of standards for existing power plants. The Clean Air Act defines a "standard of performance" as:

a standard for emissions of air pollutants which reflects the degree of emission limitation **achievable** through the application of the best system of emission reduction which (**taking into account the cost** of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been **adequately demonstrated**.⁴

The statute's plain language requires that the standard be achievable and adequately demonstrated, taking into account costs, environmental impact and energy requirements.

It is hard to agree with the EPA that the standard it has set for coal satisfies these requirements. Partial CCS for a utility-scale coal-fired power plant has not been adequately demonstrated and is extremely costly. The EPA can only point to four examples of CCS to support its conclusion; only two are actually under construction, and only one of those is in the United States. The EPA cannot point to a single completed, operational facility that meets the standard for coal it has chosen. While we believe CCS holds great promise as a technology, it is not ready to be deployed the way the EPA insists it will be deployed in the near term.

The Energy Information Administration estimates the overnight capital cost to build a new integrated gasification combined cycle (IGCC) coal plant with CCS to be \$6,599 per kilowatt (kW).⁵ This is more than six times the price of a new NGCC plant, the natural gas standard the EPA picked as the NSPS for that fuel. It is triple the price per kW of a new onshore wind farm, double the cost per kW of new hydropower and more than \$1,000 per kW more expensive than solar or

⁴ 42 U.S.C. § 7411(a)(1) (emphasis added).

⁵ <http://www.eia.gov/forecasts/capitalcost/>.

nuclear.⁶ The standard that the EPA has chosen for coal—which, by definition, must be adequately demonstrated and take into account cost—is so expensive that nobody would build it.

The EPA claims that the economic impact of its NSPS for future power plants will be minimal because low natural gas prices are causing utilities to build NGCC plants in lieu of coal. While that is true in the short term, market dynamics are always prone to change. One needs only to look back five years, when we were importing large quantities of oil and gas, coal was expected to fuel more than half of the electricity fleet, and dozens of new nuclear power plants were on the drawing board. These dynamics have almost entirely changed and could again; therefore, it would be foolish to take any energy source off the table permanently. Moreover, the Clean Air Act requires that the NSPS be revised every eight years, meaning that in eight short years, the same arguments being used to crowd out coal could be easily used to do the same to natural gas.

Existing Power Plants

The President's June 25 memorandum requested that the EPA issue similar GHG standards, regulations or guidelines for modified, reconstructed and existing power plants under Clean Air Act Section 111(d). The EPA must propose these by June 1, 2014, and finalize them by June 1, 2015. States must submit implementation plans to meet the existing source standards by June 30, 2016. The EPA is conducting a series of "listening sessions" across the country as it develops the standards for existing power plants.

⁶ *Id.*

EPA officials have indicated that they do not expect the rule on existing power plants to be as extreme as the rule for new power plants. That is welcome news for manufacturers, who consume one-third of the nation's energy supply and are directly impacted by any regulation that increases the cost or reliability of electricity. However, it is impossible not to be concerned given this Administration's views on how to address climate change. In his Climate Action Plan, the President makes abundantly clear that in his view, the only way to reduce GHG emissions in the United States is to stop using fossil fuels. We disagree. Manufacturers believe we can use fossil fuels while also innovating and manufacturing the technologies needed to limit the resulting GHG emissions. Manufacturers always find a way to innovate; it's what we do. If the EPA regulates one or more of these fuels out of the economy, we lose not only the advantages provided by the energy itself but also the opportunity to own the technology that will allow us to use it cleanly and responsibly.

A poorly crafted rule on existing power plants that results in the limitation of coal or natural gas could pose serious problems for manufacturers. Coal was responsible for 37 percent of our nation's electricity in 2012, followed by natural gas at 30 percent.⁷ While market dynamics and on-the-books regulations such as Utility MACT are increasing the share of the grid powered by natural gas and decreasing the portion held by coal, these fuels will remain the dominant sources of energy in the United States for many years.⁸

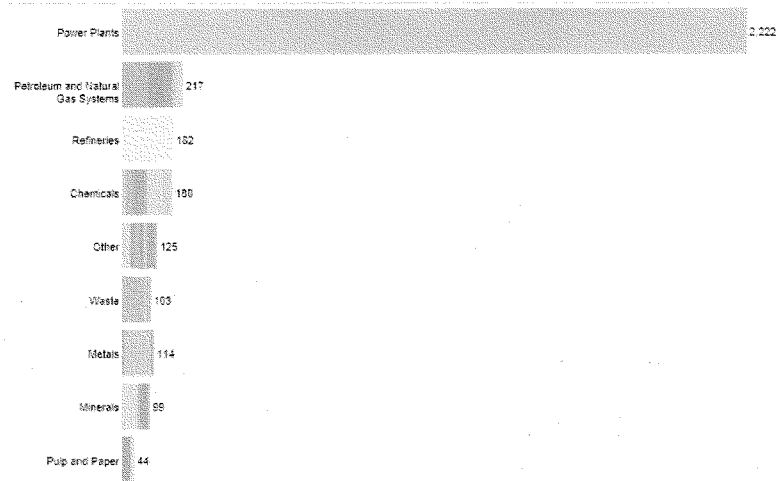
⁷ Source: Energy Information Administration.

⁸ *Id.*

The nexus between coal, natural gas and manufacturing is even more pronounced when viewed at the state level. For instance, manufacturing is responsible for 28.2 percent of Indiana's economy, the highest share in the nation. Indiana gets 81 percent of its electricity from coal and virtually the rest from natural gas. Louisiana gets 22.6 percent of its economic output from manufacturing, the third-largest share in the nation. Fifty-seven percent of its electricity comes from natural gas, 21.4 percent from coal. Ohio is third in the nation in manufacturing employment and fifth in the nation in energy consumption by the industrial sector. Ohio gets 72 percent of its electricity from coal and 18.2 percent from natural gas. The list goes on and on. Given the stakes for manufacturing in the United States, it is vitally important that the EPA craft these regulations in a way that is consistent with an "all-of-the-above" energy strategy.

Industrial Manufacturers

Once the EPA has completed the standards for existing plants, the Clean Air Act requires it to move on to other emitting sources and issue similar standards. Next up would most likely be refineries, for which the EPA committed to doing a GHG NSPS in a settlement agreement in late 2010. The industries that can expect to receive a similar rule are easily deciphered from the EPA's own website:

U.S. - Direct GHG Emissions of Selected Gases Reported by Sector/Subsector in Million Metric Tons of CO₂e

Source: Environmental Protection Agency (ghgdata.epa.gov).

"Petroleum and natural gas systems" include onshore oil and gas production; natural gas processing, transmission, compression and local distribution; and other oil and gas systems. "Chemicals" include production/manufacture of adipic acid, ammonia, hydrochlorofluorocarbons, hydrogen, nitric acid, petrochemicals, soda ash, phosphoric acid, titanium dioxide and other chemicals. "Other" includes food processing, ethanol production, underground coal mines and electronics manufacturing. "Waste" includes municipal landfills, industrial landfills, wastewater treatment and solid waste combustion. "Metals" include production/manufacture of aluminum, iron and steel, magnesium and other metals. "Minerals" include production/manufacture of cement, glass, lime and other minerals.

Because each of these sectors will receive a GHG NSPS, they are affected by the decisions the EPA is making in the NSPS for new power plants,

which could create binding precedent for future rules. For instance, Section 111(b) requires that, before an NSPS can be issued, the EPA make a finding that the source category “contributes significantly” to air pollution that endangers public health or welfare. This is a fundamentally different finding than the endangerment and cause or contribute finding the EPA made for cars in 2009. However, the EPA relies on the 2009 finding for cars as the primary justification for a finding of significant endangerment for future power plants and further argues that it need not make an independent significant endangerment finding for any other source that receives a GHG NSPS. However, by refusing to delineate what level of contribution is “significant,” the EPA makes it impossible for an industrial category to determine if its own contributions are *not* significant.

The EPA’s insistence that IGCC with partial CCS is the best system of emissions reduction (BSER) for coal represents a bad precedent for other sectors as well. CCS is a stretch technology, and while it certainly is not yet feasible for other industrial categories, those sectors all have other types of stretch technologies that simply are not cost effective or achievable, but could theoretically be required. In the proposal, the EPA cannot point to a single operating facility in the United States that uses partial CCS, a technology the EPA insists is “adequately demonstrated.” In addition, the EPA for years has maintained the practice that it cannot require facilities to “redefine the source”; it can dictate a standard of performance, but not pick a technology. Here, the EPA clearly picked a technology (IGCC) that is fundamentally different from a coal-fired boiler. A precedent based on choosing IGCC with partial CCS as the best

system of emissions reduction could have wide-ranging consequences for other industries receiving a GHG NSPS.

II. Manufacturers Support the Whitfield-Manchin Discussion Draft

I suspect that many members of this Subcommittee, both Republican and Democrat, would prefer that the EPA take a different approach to GHGs than it has done so far. I still believe you can do something about it.

Manufacturers support the recently released Whitfield-Manchin discussion draft bill, which allows the EPA to regulate GHGs but ensures that the regulations are done smarter and better. For new power plants, the bill requires separate standards for coal and gas, with the coal standard subcategorized for coal types and aligned with the best-performing commercially available generation technologies. It provides a reasonable path forward for CCS, allowing that a technology can be BSER once it has been achieved over a one-year period by at least six units located at different commercial power plants in the United States—in other words, when it is truly ready. Finally, it allows the EPA to craft rules or guidelines for existing power plants, but it requires Congress to review them and set an effective date before they can take effect.

Manufacturers stand ready to work with the sponsors of this legislation to attract broad, bipartisan support and ultimately to enact it. The bill would give manufacturers regulatory certainty by preserving a true “all-of-the-above” energy policy. For new power plants, it allows the market to govern—with or without the EPA’s rule, most new plants in the near term will be natural gas—but it protects against potential market shifts by providing reasonable options to build new coal

plants if natural gas prices change. It would give utilities and manufacturers the time they need to make the investments necessary to comply with standards for new and existing power plants. In addition, it provides for real checks and balances on the existing plant rule, ensuring that this highly important, first-of-its-kind set of regulations is carried out in a deliberative, bipartisan fashion. The NAM suggests that a section be added to the bill to clarify what “substantial endangerment” means for GHGs and to aid industrial sectors receiving future GHG NSPS in understanding whether they will truly qualify.

Had the EPA’s proposed rule for new power plants resembled the portion of the Whitfield-Manchin bill applying to those plants, I believe we would be having a much different conversation today. By enacting the Whitfield-Manchin bill, Congress can steer the EPA toward an end result that accomplishes long-term meaningful reductions in GHG emissions while preserving a healthy and robust manufacturing sector.

Mr. WHITFIELD. Well, thank you, and thank all of you for taking time to be with us, and for your testimony.

Attorney General Pruitt, Ms. McCabe talked about the cooperative spirit with the states, and I know that many states that I have heard from are quite concerned about EPA setting standards and not working in a cooperative way, becoming more and more aggressive with states. What has your experience been? Would you classify your experience with the EPA on recent rules and regulations in a cooperative way, or has it been an adversarial way? How would you describe it?

Mr. PRUITT. Well, Mr. Chairman, two responses. I think, under 111(d), it is very clear that Congress intended that cooperative federalism be alive and well, as it relates to that particular section. Our experience with the Regional Haze rule that I mentioned in my comments demonstrates that the EPA has taken a different approach respecting the role of the states in cooperative federalism.

Under that rule, as you know, the states are authorized to determine the methodology, the process, the plan, to meet the guidelines that you, in Congress, and the agency has set, which is natural visibility by the year 2064. Oklahoma did just that in the year 2010, and beat the deadline by decades. But the EPA rejected the plan, and simultaneously endeavored to force upon the State of Oklahoma a federal plan that would cost \$2 billion, primarily because, Mr. Chairman, in my estimation, fuel diversity was maintained. Coal plants, along with natural gas, were maintained. Fossil fuels were being utilized in the plan, and the EPA didn't like that, and rejected the plan.

So, though we have talked a lot about that today, and Ms. McCabe made reference to cooperative federalism, I guess I will draw upon President Reagan's comment in the '80s about trust, but verify, with respect to foreign policy. The states have routinely endeavored to trust and work with the EPA, but, in response, particularly around the Clean Air Act, and the Regional Haze Program, it has not been demonstrated that they are, in fact, respecting the states' role.

Mr. WHITFIELD. Yes. Well, thank you, Mr. Pruitt.

Mr. Hawkins, and Mr. Eisenberg, I want to thank you for your comment, but you used the word repeal, that we were repealing their authority, the EPA's authority, under our legislation, and we actually don't repeal it. We set some parameters, and, on the existing plants, the only power that Congress would have would be to set the effective date.

But in the larger context, all of us understand that coal is not being used as much today, certainly for new plants, because natural gas prices are so low. We definitely understand that. And I think Mr. McKinley made a great point. 805 billion tons of CO₂ emissions each year, about 3.5 percent of that is man-made, and fossil fuel, U.S. coal plant emissions, amounts to, like, $\frac{2}{10}$ of a percent.

So then it raises the question of moving forward, we live in a very unpredictable world. We don't know what is going to happen. Why should the U.S. be the only country in the world that has standards so stringent on emissions that practically you cannot build a new coal powered plant? As I said in my opening state-

ment, Europe is closing down 30 gigawatts of natural gas plants, mothballing them, because of high natural gas prices, and they are building more coal powered plants.

And so why are we taking these extreme efforts that would basically eliminate coal from new opportunities only in America? And I would like to hear all of you, if you want to make it brief. Yes, Mr. Hawkins, you go right ahead.

Mr. HAWKINS. Well, to begin, the United States is not the only country that is requiring carbon capture performance on coal plants. The United Kingdom does, and our neighbor to the north, Canada, does. Both of those countries have in place rules and—

Mr. WHITFIELD. But are the emission standards as stringent as here?

Mr. HAWKINS. The Canadian standards—

Mr. WHITFIELD. Could you build a Turk plant in Canada, or—

Mr. HAWKINS. The Canadian standards apply to new plants and to existing plants, after they reach 40 years of life.

Mr. WHITFIELD. Well, let me just say, and we can talk about this some more, I have had some discussions with people about that, and it is my understanding that they are significantly different. But I would just tell you, when $\frac{2}{10}$ of the emission comes from coal plants in all the emissions worldwide, this is, in my view, a pretty extreme position. All we are saying is, with our legislation, we want it to be an option that people would have the opportunity to utilize it.

Mr. HAWKINS. Mr. Chairman, may I say one word about natural versus man-made? The statistics that you are citing are confusing what are natural fluxes of hundreds of millions of tons that go out of the ocean every year, hundreds of billions of tons that go back into the land every year. There are no net emissions from those huge transfers. The only net emissions are caused by human activities, and man is responsible for 100 percent of the increased emissions. These natural fluxes have nothing to do with—

Mr. WHITFIELD. Well, all I am saying is that the Intergovernmental Panel on Climate Change, the Energy Information Administration, and EPA have said 803 billion tons total emissions, and man-made, 3.5 percent.

Mr. HAWKINS. Yes, but they include equal amounts out and equal amounts in from the natural system. So those natural systems that are included in those 800 billion add nothing to the atmosphere.

Mr. WHITFIELD. So do you think we might be able to anything with our legislation that you will support us?

Mr. HAWKINS. To do what, sir?

Mr. WHITFIELD. Do you think we could do anything with our legislation in which you would support us?

Mr. HAWKINS. With your legislation? Yes. You could change it around so that you would return to some of the provisions that were in the Waxman-Markey bill, which this committee did report out, and this House did approve, with seven or eight Republican votes at the time. You could turn it into a program that would actually deploy carbon capture and storage. And if you did, we would support it.

Mr. WHITFIELD. Thank you.

Mr. McNerney, you are recognized for 5 minutes.

Mr. MCNERNEY. I thank the Chairman, and I thank all the witnesses. I know it is a long trip, it is a long day, and it is an issue with a lot of different perspectives.

In 2011, I am going to direct a question to you first, Ms. Tierney, the American Electric Power proposed to develop a large CCS plant in West Virginia, but they had to cancel because, as the CEO explained, without federal carbon pollution standards, it couldn't get recovery for that investment. You do work with executives. Is that a typical experience?

Ms. TIERNEY. Yes. It is common, if a regulated utility does not see that they are required to do something, they have a difficult time making the case before regulators about a cost associated with that. So that was what was behind the AEP decision to cancel that project.

Mr. MCNERNEY. OK. One more question. In your testimony you mentioned that the EPA rules will address public health and help ensure that coal and natural gas remain viable. Would you expand on that a little bit?

Ms. TIERNEY. Yes. Right now it is clearly the case that, as I mentioned, the investment choices that are being made by the electric industry are for renewables and natural gas projects. Coal is just simply too expensive, too large a capital investment to make, and too risky, with regard to what will happen with controls on carbon in the future.

So having certainty, such as that which EPA will be introducing with their guidance on existing rules, excuse me, guidance on existing plants, and their regulations on new plants, will provide a framework under which people can make investments, push technology forward, so that eventually we can find a time when coal and natural gas, with carbon capture and sequestration, can go forward. And I am speaking of coal when I say that.

Mr. MCNERNEY. OK. Mr. Hawkins, you mentioned that the benefits basically outweigh the costs. I think you mentioned a \$20 billion benefit for a specific case, compared to a \$4 billion cost. Could you describe that a little bit?

Mr. HAWKINS. Yes. This was an analysis that NRDC did of an approach to regulating existing power plants, and those 25 to \$60 billion benefits were a combination of health benefits associated with reduced soot and smog pollution from the power plants whose emissions would be cut, as well as climate protection benefits based on the administration's earlier social cost of carbon calculations, on what is the benefit of reducing a ton of carbon. Those were the earlier benefits costs, not the current higher costs. So that was the basis of the conclusion.

It does cost something. It is not a free program. But \$4 billion in a several hundred billion dollar a year industry is definitely a digestible cost. And when you compare that to the 25 to \$60 billion in public health and climate protection benefits, this is a bargain.

Mr. MCNERNEY. Thank you. Well, this next one is going to be addressed to you as well. In 2008 coal supporters trumpeted new technologies to reduce carbon emissions from coal, while providing affordable electricity. Now, there was a lot of optimism at that point. I would like to show another TV advertisement that was produced in 2008 from the coal industry.

[Video shown.]

Mr. MCNERNEY. So what that shows is the coal industry was willing to spend money to put out advertising on TV to promote this. There was a lot of optimism in 2008. Was the coal industry right? Did they have the technology ready to go, or was that a fantasy at that time?

Mr. HAWKINS. As far as carbon capture and storage is concerned, I still believe it.

Mr. MCNERNEY. Where did all that spirit and optimism go?

Mr. HAWKINS. Well, unfortunately, when faced with a requirement to actually perform to these promises, the industry has taken a very short-sighted view, and basically said, no, what we want to do is block EPA. And the legislation would prevent power sector customers of coal to actually be able to finance plants, because those plants would not be in anticipation of any future EPA regulation, because EPA couldn't consider the results if there was any government money in them, and the financing wouldn't happen unless there were some government money, because there were no requirements. It is a perfect catch-22.

Mr. MCNERNEY. Thank you. I yield back.

Mr. WHITFIELD. Gentleman's time has expired. At this time recognize the gentleman from Texas, Mr. Olson, for 5—

Mr. OLSON. I thank the Chair, and welcome to our witnesses. I know it has been a long morning, so I would like to pick you up with a greeting we say in Texas. Howdy, you all.

My first question is to you, Mr. Eisenberg. As you know, sir, we have the world's strongest economy, and highest quality of life, because we have cheap, reliable sources of power. Reliable power is a matter of life and death in many cases for average Americans. But below that, cheap, reliable power is critical to the manufacturing revival we are seeing all along America, and along the Texas Gulf Coast, the whole Gulf Coast. No company would invest in a multi-billion dollar project if they have to constantly rely on backup generators, or worry about the power going out. Can you describe how electric reliability and rates impact investment decisions?

Mr. EISENBERG. Absolutely. Thank you for the question. For many manufacturers, and certainly a substantial portion of my membership, for many of them, energy is their single greatest expense. So they are going to go, and they are going to build, and they are going to expand where energy is reliable, where it is affordable, and, yes, I mean, where they can get it, and where they can get it cheaply.

I listed, I don't know, five or six states in my testimony where there is this unbelievably evident nexus between coal, natural gas, manufacturing. I mean, I could have listed 25 states. I could have listed 35 states. If you look at a map, that is where the manufacturing is. It is where energy is inexpensive. And I am not saying that it only has to be those two. There are plenty of places in the Northeast, and in the West, in the Pacific Northwest, where we are using hydropower, renewables, and other things like that, and nuclear.

But energy matters. It matters a lot to manufacturers. It may not be the only thing that matters, but for a lot of them, it is a

very, very, very large part of why they make a decision to locate in a certain place, or to expand in a certain place.

Mr. OLSON. Thank you for that answer, sir.

Question for you, Mr. Campbell. You mentioned in your testimony that your utility serves some of the neediest people in Kentucky. And I know that during the recession, the number of people behind on their electric bills skyrocketed, exploded. It is a real cost to consumers, and your consumers in particular. Can you tell me how price sensitive the residents you serve are? I mean, how much does it hurt them if prices go up?

Mr. CAMPBELL. Well, the people we serve are some of the poorest people in Kentucky, and cooperatives, by their nature, serve a lot of the poorer part of the country. But let me give a relation to East Kentucky Power Cooperative. Over the last decade, we have doubled the price of our power, and a large portion of that is because of the consent decree that forced us to put on some of the scrubbers for nitrous oxide and sulfur dioxide early. We did it early. And they are very sensitive being able to afford our power.

And if we look at CO₂ right now, and I will just use the President's suggestion of a cap and trade program, and \$38 a ton for CO₂, our revenue this year is about \$900 million. And if we had \$38 a ton tax on top of that for every CO₂ ton that we released, that would increase us about \$470 million, so that is going to be another 50 percent rate increase on some of the poorest people in the country. So they are going to have to start to choose, can they afford medicine, can they afford food, or are they going to afford electricity?

Mr. OLSON. So basically their whole life is impacted dramatically by these increases in costs? I mean, they might not buy health care, which means they will be more prone to all the bad problems we have in our health care industry right now. They won't have the jobs. I mean, this is not just something that is in Kentucky. This is all across the country.

Mr. CAMPBELL. That is correct.

Mr. OLSON. And my final question, I have got 25 seconds here, is for you, Dr. van der Vaart. The EPA has very concrete benefits to claim, few of them, in the proposed new plant rule. It will, however, help them check an important box. The EPA crows in the proposal that one benefit is that, and this is a quote, "The proposed rule will also serve as a necessary predicate for the regulation of existing resources." This rule has always been about cutting new plants off at the knees so they can focus on existing ones. As we look at the costs and benefits of the new plant rule, should we also be considering the costs of a sweeping rule on existing plants?

Mr. VAN DER VAART. Yes. Obviously, under Section 111(d), the states, when implementing the standard, have the duty to consider costs. I think that what you raise is an interesting facet of the new source. It is a required predicate for the EPA to pursue a 111(d) program for existing sources. I think it is also a predicate to their true desire, which is a cap and trade, and they are trying to use a very stringent new source standard, perhaps, as a bogey for that. And they are trying to use the word flexibility to hide their desire of including off the fence, or off the property, reductions that go into a cap and trade so-called target.

Mr. OLSON. Thank you, sir. I am way above my time. I am much obliged for your answers. Thank you, Mr. Chairman.

Mr. WHITFIELD. Gentleman's time has expired.

At this time recognize the gentleman from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman. Again thank our panel.

Mr. Eisenberg, there is concern about regulations having economic impact on manufacturers, and, of course, the cost of their electricity, like you just said. Are any of your members manufacturers of CCS technology?

Mr. EISENBERG. They are.

Mr. GREEN. Are they optimistic about the economic output related to the manufacture of this technology moving forward?

Mr. EISENBERG. You know, they are. They, like NAM, believe that we can have this technology, and that it can work. The issue is when? You know, and one thing that has come up throughout the course here is, this bill actually is relatively consistent with what everybody else has been saying as to when CCS has been available, and a lot of my members are telling me that as well. EPA, in last year's rule, said that CCS would be available 8 years from whenever the rule was enacted, 2022. Waxman-Markey would have required, I think four gigawatts of demonstrated and achievable CCS, and then wouldn't require it for 4 years after that. So this is entirely consistent.

So it is a long winded way of getting to our members do think that we can get there. I think we can get there. I just don't think we are there right now.

Mr. GREEN. OK.

Dr. Tierney, the current EPA proposal created separate categories for natural gas and coal. In this legislation, there is a further subdivision of coal. Now, if you can't tell from my accent, I am from Texas, and we burn dirt and call it coal, but natural gas has been our fuel of choice, and it has grown substantially. Does the additional category have any economic cost or benefit to it?

Ms. TIERNEY. To whom was that addressed?

Mr. GREEN. Ms. Tierney.

Ms. TIERNEY. I am sorry. Because I wasn't expecting this to come to me, did you say at the very end that this raises costs?

Mr. GREEN. Well, no, I wanted to know, the current EPA proposal separates categories of natural gas and coal. In this legislation, the further subdivision of coal, does this additional category have any economic cost or benefit to it, if there is a separate—

Ms. TIERNEY. Yes, I think it does have a benefit to it, because it allows for a different treatment of coal relative to natural gas by size and category of technology. So, yes, it does provide more flexibility inherently with those two categories.

Mr. GREEN. Well, that concerns me somewhat.

Mr. Pruitt, in Texas we have lots of natural gas, and we are discovering more and more each day. And I know Oklahoma is our neighbor, and, if you all would leave our football players at home, we would be really happy.

Mr. PRUITT. We don't want to do that, Mr. Green.

Mr. GREEN. Natural gas continues to expand its footprint for fuel, for power generation. Can you comment on the role of natural gas in your state's power generation/fuel mix?

Mr. PRUITT. I mean, as Attorney General, many of us across the country represent ratepayers—

Mr. GREEN. Yes.

Mr. PRUITT [continuing]. Before our respective corporation commissions as these types of discussions ensue. And I think the most important thing is fuel diversity. I think the utilities need the ability to choose between natural gas and coal, other forms of energy, to provide electricity to their consumers. I think when policy is being used, regulation is being used, to pick winners and losers, elevating certain energy over others, it is detrimental, ultimately, to the consumers in our respective states.

Mr. GREEN. And I can see that. The other issue is that we have had environmental laws for many years, and this would overlay it with carbon. And I know you don't do some of the things in producing electricity, I mean, like NO_x. That was built into the cost of our utility providers. But carbon sequestration, or control, would be just added additional cost.

But if you are comparing coal with natural gas, or wind, and I don't know Western Oklahoma very well, but I know West Texas, and parts of South Texas, and the wind power growth has just been amazing. We know there are no carbon problems with wind, or even solar, if someday we get to it in our part of the country. But natural gas is half the carbon footprint of, for example, coal. So natural gas would probably be the fuel of choice, if we ended up going more for carbon sequestration.

Mr. PRUITT. And I think that is, in fact, happening, as far as utility companies, because of the low cost of natural gas presently.

Mr. GREEN. Yes. It is based on cost now, not because of the environmental impact, I guess, of natural gas.

Mr. PRUITT. Perhaps, but I think that base load energy between coal and natural gas, fossil fuels generally, it is ultimately very important to utility companies to have the ability to choose what is the best source of their energy as they provide the electricity to the consumers.

And Congressman, I think the issue for the states is that ultimately there is a role for us to play. It has been recognized here today by Ms. McCabe and others, and we see, under the Regional Haze Program, and we are concerned about, under this particular proposed rule, that the state's role will be diminished, and that the cost benefit analysis will be not properly addressed by the EPA. And that is the reason we are concerned about that, prospectively.

Mr. GREEN. OK. Thank you, Mr. Chairman. I know I am over time.

Mr. WHITFIELD. Gentleman's time has expired.

At this time recognize the gentleman from Virginia, Mr. Griffith, for 5—

Mr. GRIFFITH. Thank you, Mr. Chairman. I would point out several times folks have said that, obviously, power companies want to build gas power plants, which is certainly true, because of the cost of natural gas, but I also think, and, Mr. Campbell, I am going to direct this question towards you. I also think that power compa-

nies would be looking more at coal if they thought they could build something that would be effective, because the price, most recent that I have is September, is 3.62 per 1,000 cubic feet for natural gas. And experts have previously testified in front of this committee at \$4 you are at a position where you are breaking even on the production of the energy between coal and natural gas. And a couple times this year we have actually gotten up to that \$4 level, and people project over the next few years that we probably will break that \$4 level on natural gas.

And isn't it true that most electric power companies like to have a diversity so that if natural gas prices spike, they can rely on coal, and if coal prices spike, they can rely on natural gas, and also look to other resources? Is that not true? Is my understanding correct?

Mr. CAMPBELL. That is absolutely correct. In fact, our strategy in Kentucky, at East Kentucky, is to diversify our portfolio naturally. We will probably go to a little bit more natural gas, because we realize there are regulatory risks out there too. But we think a healthy diversity of fuel is good for all of us.

Mr. GRIFFITH. Now, your headquarters is a little bit outside of my district, but I do touch Eastern Kentucky, down on the southwestern end of my district, and I also represent a lot of folks who are struggling to make ends meet. And you believe that these new regulations, if we don't pass the Whitfield-Manchin bill, will cause the electric prices to go up for those people, don't you?

Mr. CAMPBELL. I do believe that they will naturally make costs for those people to go up. I believe the new source performance standards, with low natural gas, if you assume that will go to gas, that will probably keep the rates steady. But if you look into the future, and we all have a mad dash to gas because we are not going to clean our coal plants up with CCS, carbon capture and sequestration, that is going to drive costs up.

Mr. GRIFFITH. And the programs, in my area, at least, if we get a cold winter, the programs that help people heat their homes who can't afford it, they don't last all winter. Is that true in your area as well?

Mr. CAMPBELL. We do. They run out of funding, and churches help, and some people just have to live with less electricity.

Mr. GRIFFITH. And what they do is they end up crowding into one room, several people, or, if it is an elderly person living alone, they just heat one room. Isn't that what they do you in your area as well?

Mr. CAMPBELL. That is correct. Yes, sir.

Mr. GRIFFITH. And that is a shame, isn't it?

Mr. CAMPBELL. Yes, sir.

Mr. GRIFFITH. And policies from the Federal Government really ought not do that to people, where they make these choices, isn't that correct?

Mr. CAMPBELL. Yes, sir.

Mr. GRIFFITH. And you have seen studies that also would show that that affects their health, doesn't it?

Mr. CAMPBELL. It does.

Mr. GRIFFITH. In a negative way, not a positive?

Mr. CAMPBELL. Yes. Electricity has really increased the life expectancy of the people of the United States. No one can not say that electricity hasn't improved our lives.

Mr. GRIFFITH. And affordable electricity makes that even better?

Mr. CAMPBELL. That is correct.

Mr. GRIFFITH. Dr. van der Vaart, if I might ask you, as a regulator, and as a lawyer, as a legal matter, under Section 111(d), the issue, in terms of setting carbon dioxide standards of performance, is what is achievable at an existing electric generating unit. Isn't that correct?

Mr. VAN DER VAART. That is correct.

Mr. GRIFFITH. And I would ask both you and Attorney General Pruitt, as regulators, can you discuss your concerns about the EPA seeking to regulate beyond the scope of its authority in planned regulations of existing electric generating units?

Mr. VAN DER VAART. I would just like to say, if it does, in fact, pass the legal thresholds I referred to, the issue is that the Clean Air Act only provides authority for a reduction feasible by the institute of technology on the emission unit. What I heard earlier today is that a target, which is a euphemistic way of saying a limit, will be set by the Federal Government. That is my experience as well. If, however, in setting that limit the EPA includes the entire system, demand side management, you are going to have a number that is absolutely unachievable at a single unit.

Mr. GRIFFITH. And I understand that. Attorney General?

Mr. PRUITT. Congressman, I would say that the EPA may require the states to adopt standards, the EPA may guide the states on how to do that procedurally, but ultimately the states are vested with the legal authority to decide the ultimate standards. And I think that is what is important, is we talk about these 111(d) discussions we are having.

Mr. GRIFFITH. Well, I appreciate that very much. In regard to CCS, I would agree with you, Mr. Eisenberg. We may get there someday. We are not there yet, and what we are going to do is we are going to make people in my district, and in Mr. Campbell's service area, and people all over the United States pay more for electricity, and that is going to negatively impact not only the amount of money in their household, but also, as we have heard today, it is going to affect negatively their health, and their viability in the world. And so it is a real shame that some people are opposed to this really good bill that Chairman Whitfield has introduced.

With that, Mr. Chairman, I yield back.

Mr. WHITFIELD. At this time recognize the gentleman from West Virginia, Mr. McKinley, for 5—

Mr. MCKINLEY. Thank you again, Mr. Chairman. Mr. Chairman, I have got two reports here, two white papers, one by Dr. Christie and Dr. Bajerob on this subject, and I would ask unanimous consent they be entered into the record. Mr. Chairman, ask these reports be entered into the record.

Mr. WHITFIELD. Without objection, yes.

Mr. MCKINLEY. Thank you. Also, I have come here as an engineer, and I want to make sure we avoid Washington-speak, and it happens a lot. It happened in the earlier panel, where were just

trying to get a direct answer about whether or not, under the new source performance standard, was going to increase the cost of the production of coal, coal-fired generated electricity. She wouldn't give us the answer.

So my question, the two of you that are engineers on the panel, would you say that, if the new source performance standard goes into effect, will it cost more for those power plants that use coal?

Mr. VAN DER VAART. Yes, it definitely will.

Mr. MCKINLEY. Will the cost of electricity increase?

Mr. VAN DER VAART. Yes.

Mr. MCKINLEY. Thank you. And you?

Mr. CICHANOWICZ. Absolutely.

Mr. MCKINLEY. Why can't people just say that straight out? Why is Washington-speak so confusing? Thank you for that.

Mr. van der Vaart, studying your body language in some of the testimony from Mr. Hawkins, it seemed like you might disagree with some of his comments. Would you like to expound a little bit, clarifying some of his statements?

Mr. VAN DER VAART. I think my comments covered my position pretty well. Again, I am very concerned whether there is any legal authority for the EPA to do what they are doing, both in the existing source category, but also even in the way that they are promoting the new source requirements.

Mr. MCKINLEY. Let me close in the timeframe I have, maybe open to the panel. If all of these regulations are imposed, and we de-carbonize America, who wins? Because the carbon is still going to be generated around the world. We know that Russia and China are going to continue. So who wins? Our workers are going to lose their jobs. Our manufacturing is going to lose its edge, because the cost of electricity is going to go up. So who wins?

Mr. Hawkins, can you tell me? Who wins?

Mr. HAWKINS. The American people will win.

Mr. MCKINLEY. If they don't have a job they win?

Mr. HAWKINS. I will explain why I believe that.

Mr. MCKINLEY. Make sure—

Ms. HAWKINS. I will do it quickly. The United States has an incredibly successful model with the Clean Air Act, and this is not just theory. We have proven that when the United States steps out and demonstrates to the rest of the world that it is possible to use American ingenuity to deploy technology to clean up our big pollution sources, protect public health, and improve the economy at the same time, other countries get it, and they follow, and it helps everyone.

Ms. TIERNEY. And when you think about the fact that the United States has put more carbon pollution into the air cumulatively, compared to any other country, it is our turn to lead, and we will be able to innovate and move the rest of the world with us.

Mr. MCKINLEY. OK. I am just curious.

Mr. Campbell, how about you? Who wins?

Mr. CAMPBELL. Well, let me say, long term, I think everyone could win, but let us just look at the Clean Air Act. And I understand a lot of people say, boy, if you just do this, the technology will come. Build it, and they will come. Look, the Clean Air Act came, Congressman Waxman said this morning, in 1974. That is

correct, and it was 40 years, and we had somewhat of a proven technology. Now we don't have that, and they are trying to shrink that down on everybody, and we are just going to do it. And I don't think that can happen, and I think we will be a loser.

I think we have to keep the economy of the United States strong so we can find these technologies, so we can help the world. If you look at nitrous oxide, and sulfur dioxide, and particulate matter cleanup that we did, China is not building a lot of those plants with that back-end equipment. I mean, I have been trying to sell a coal plant that I have right now overseas. None of them want the back-end equipment.

Mr. MCKINLEY. Thank you, Mr. Campbell.

Mr. Cichanowicz?

Mr. CICHANOWICZ. Yes. I—

Mr. MCKINLEY. Am I close on that? My question—

Mr. CICHANOWICZ. Pretty close.

Mr. MCKINLEY [continuing]. In part is not only who wins, but also, again, your body language, you seem to be concerned whether or not we have actually demonstrated enough process that we are ready to implement. You know that Ernie Moniz came out last week and said, it is ready, we are ready to implement carbon capture. And I got the sense that you don't agree with that.

Mr. CICHANOWICZ. Certainly I don't, and we have had some comments all morning about how if the power industry would just get to work on things, the problems would go away. Certainly you can deploy many advanced technologies. It just takes time. All these have risk, and you can go back to selective catalytic reduction in scrubbers. Yes, they are successful now, but everybody keeps forgetting, that took a while. It took decades to sort out the problems.

And I think in my testimony I was clear, maybe we will have an answer in 2020. We don't know yet. But it just takes time to do the work, and understand the risks, and come up with possible solutions.

Mr. MCKINLEY. Thank you very much. My time has expired.

Mr. WHITFIELD. Gentleman's time has expired. Well, that concludes today's hearing. I want to thank all of you for being focused on the issue, and for your time and effort. I know many of you traveled long distances, but we do appreciate it.

And, Mr. McNerney, you have some documents you want to enter into the record?

Mr. MCNERNEY. Yes. Mr. Chairman, I ask unanimous consent to enter into the record two letters from organizations expressing concerns with, and opposition to, the proposed bill, due to its anticipated negative effects on climate and public health. The first is a letter from the American Lung Association, American Public Health Association, and other health and medical associations. The other is a letter from 79 environmental groups, and other organizations, on behalf of their members and supporters.

Mr. WHITFIELD. Without objections, so ordered. Thank you.

[The information was unavailable at the time of printing.]

Mr. WHITFIELD. And then I also would like to enter into the record, I know the NRDC, in their testimony, had included a proposal relating to these issues, and we had the National Economic Research Associates do an analysis, and a letter from the American

Coalition for Clean Coal Electricity relating to that. And then I would also like to enter into the record letters from the U.S. Chamber, the National Association of Manufacturers, and the Fertilizer Institute about the discussion draft.

[The information appears at the conclusion of the hearing.]

Mr. WHITFIELD. And then did you all get copies of the documents that Mr. McKinley wanted to introduce? OK.

Mr. MCNERNEY. Yes. Mr. Chairman, we got those late, so we would like to have a chance to review those.

Mr. WHITFIELD. OK. So you all can review them, and we will keep the record open for 10 days. Remind members they have 10 days to submit questions for the record. And I ask the witnesses all agree to respond to any questions we may have for you all, if you would.

So, thank you again, and I know that we will be seeing you again as we go along, working on these issues. The hearing is adjourned.[Whereupon, at 1:14 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]



November 13, 2013

The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am writing to provide information regarding the potential impacts of a proposal by the Natural Resources Defense Council (NRDC) to reduce carbon dioxide (CO₂) emissions from existing coal-fired and natural gas-fired electric generating units under section 111(d) of the Clean Air Act. The American Coalition for Clean Coal Electricity (ACCCE) opposes the regulation of CO₂ and other greenhouse gases under the Clean Air Act because the Act is not designed to regulate greenhouse gases and any effort by EPA to do will cause unnecessary economic harm.

Despite its legal flaws, the NRDC proposal has received attention as a possible approach for EPA to follow in developing a CO₂ emissions reduction program under section 111(d). For that reason, ACCCE asked National Economic Research Associates to analyze the proposal to better understand its potential impacts. Although we are still in the process of reviewing the NERA analysis and expect to release final results shortly, we felt that sharing some of the insights with the subcommittee at the present time would help to further the subcommittee's understanding of the NRDC proposal.

After considering various approaches and assumptions, NERA modeled two scenarios based on the NRDC proposal: a "maximum flexibility" scenario and a "limited flexibility" scenario. Modeling these particular scenarios helps provide an understanding of the range of possible impacts of the proposal. In both scenarios, NERA adopted more realistic assumptions regarding energy

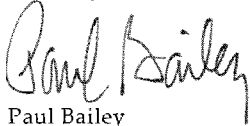
efficiency, a key element of NRDC's proposal. NERA's maximum flexibility scenario is similar to the NRDC proposal, except that NERA assumed more flexibility in terms of interstate trading than NRDC assumed. However, the limited flexibility scenario approximates what we believe is more likely to occur under NRDC's proposal because individual states would not have enough time under EPA's rulemaking schedule for 111(d) to develop and reach agreement on trading programs that attempt to limit some of the negative economic impacts of the NRDC proposal.

The attached table compares some of the assumptions and impacts of the NRDC analysis and the NERA analysis. In several instances, NERA's analysis provides information that was not made available by the NRDC analysis. Additional results from NERA's modeling will be available when we release the final analysis.

Our conclusion is that the NRDC proposal would cause substantial economic harm and any such harm is impossible to justify, especially considering the fact that the global climate effects resulting from the NRDC proposal would be virtually meaningless. For example, according to the analysis conducted by NERA, the CO₂ reductions that would result from the NRDC proposal represent, at most, 1 percent of global anthropogenic greenhouse gas emissions.

We hope this information is helpful, and we are grateful for your continued leadership on this critical issue.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Bailey". The signature is fluid and cursive, with the first name "Paul" and last name "Bailey" clearly distinguishable.

Paul Bailey
Senior Vice President
Federal Affairs and Policy

Attachment: Comparison of modeling results

Attachment to November 13, 2013 Letter to Chairman Whitfield

	NERC Analysis	NERA Analysis
Model	IPM: electric sector only	N-ERA: electric sector plus other sectors of the economy
Energy market assumptions	Based on AEO 2011	Based on AEO 2013
Energy efficiency	Based on Synapse report (2011) prepared for Civil Society Institute	Based on Alcott and Greenstone (2012) from NERA economic literature
Cost	Arrested coal conversion costs of \$4 billion in 2020	Total costs to consumers of as much as \$1.45 billion (2018 - 2023)
Additional coal retirements	20 CWT	As many as 80 CWT
Cost of natural gas for non-electric sectors	Not provided	Up to \$52 billion
Job losses	Not provided	As many as 131,000 jobs lost by 2018 and 2.85 million jobs lost over 2018 - 2023
Electricity price increases	Wholesale power prices 4% lower in 2020; retail prices not provided	Retail prices increase by double digits in 27 states
CO₂ reductions	567 million tonnes in 2018 and 565 million tonnes in 2020	Up to 484 million tonnes/year (averaged over 2018-2023)

Contribution to Hearing on EPA's proposed GHG Standards for New Power Plants
14 Nov 2013

Submission by John R. Christy
University of Alabama in Huntsville.

I am John R. Christy, Distinguished Professor of Atmospheric Science, Alabama's State Climatologist and Director of the Earth System Science Center at The University of Alabama in Huntsville. I have served as a Lead Author, Contributing Author and Reviewer of IPCC assessments, have been awarded NASA's Medal for Exceptional Scientific Achievement, and in 2002 was elected a Fellow of the American Meteorological Society.

It is a privilege for me to offer evidence concerning climate change based on my experience as a climate scientist. My research area might be best described as building datasets from scratch to advance our understanding of what the climate is doing and why. I have used traditional surface observations as well as measurements from balloons and satellites to document the climate story. Many of my datasets are used to test hypotheses of climate variability and change.

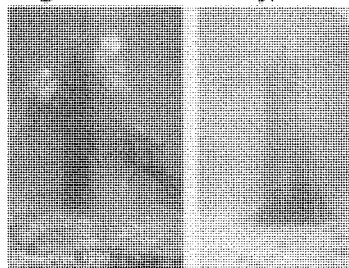
Extremes

As the global temperature failed to warm over the past 15 years, it became popular to draw attention to the occurrence of extreme events as worrisome consequences of increasing concentrations of greenhouse gases. For example, many claims have been made that climate events of the past 50 years are unprecedented, or highly unusual and therefore must be caused by human influences. One can only establish such events as statistically unusual, a lower standard than unprecedented, if a minimum of 30 or more such periods with consistent data are available. This means we need 1500 to 2000 years of information with which to compare our recent 50-years of history to determine whether any characteristic is unusual.

For a few parameters we have such data. Severe drought leaves a clear impression on the planet and we know that our nation experienced droughts in the 12th century, the so-called mega-droughts, which were much worse than any we've seen in the past century. Thus, droughts of the past 50 years are not unusual and obviously not unprecedented as shown next.

California

At right are photos from Lindstrom (1990) of divers examining trees which grew on dry ground around 900 years ago in what is now a Sierra Nevada alpine lake. This indicates that a drastic



but natural change to a much drier climate must have lasted for at least a century for trees to have grown to these sizes on dry ground.

Rocky Mountains

A 500-year history of moisture in the upper Colorado River basin (below) indicates the past century was quite moist while major multi-decadal droughts occurred in all four prior centuries (Piechota et al. 2004.) Indeed, the conclusion of Piechota et al. states that after examining the paleo-record, the present-day droughts “could be worse.” These and other evidences point to the real probability that water supply in the West will see declines simply as a

matter of the natural variability of climate.

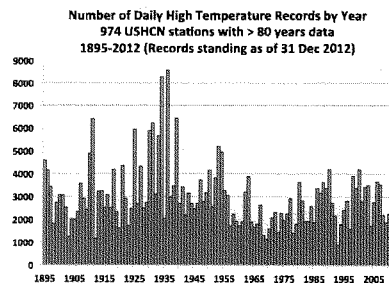
Great Plains

In the Great Plains, the period from 3000 to 1500 years ago saw a drier and warmer climate during which a significant parabolic sand dune ecosystem developed, especially in western Nebraska and NE Colorado (Muhs 1985). In other words, parts of the Great Plains resembled a desert. Many of these areas experienced dune “reactivation” during Medieval times (900-1300 AD). Then, the climate moistened and cooled beginning around 1300 AD to support the short-grass prairie seen today, though “reactivation” is possible at any time (Schmeisser, 2009). Indeed, Muhs and Holliday (1995) found that dune reactivation can occur within decadal time scales from extended drought by examining the Great Plains environment of only the past 150 years.

With the massive use of ground water for irrigation, the High Plains Aquifer has declined an average of 12.8 ft, with some areas in the Texas panhandle down over 150 ft. The key point here is that the Plains is subject to natural (and sobering) long-term droughts that would very likely tax the current water management system (ground-water withdrawals) while not replenishing the aquifer, producing a situation of reduced agricultural productivity, especially in its southern reaches.

U.S. Daily High Temperature Records

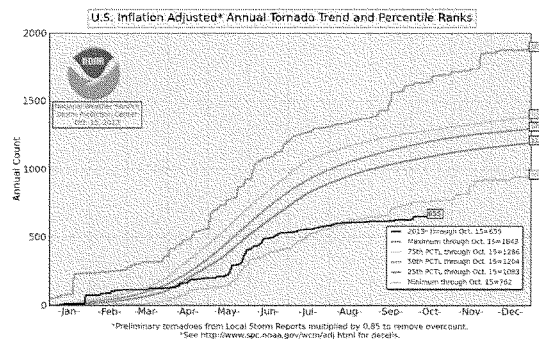
Are daily high temperature extremes becoming more frequent? To answer such a question, one must obviously consider datasets that span an appropriate length of time. If one does the analysis with stations of at least 80 years of data, and determines the number of daily temperature records by year that stand as of 31 Dec 2012, the



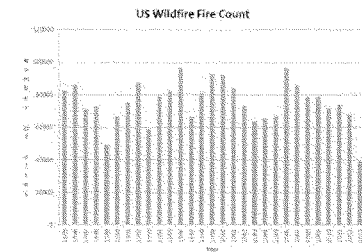
answer to the question is “no.” It is true that the number of records in 2012 was quite high, thanks to a very warm March and a hot Mid-Western summer. However in comparison to the heat waves of the 1930s, the summer was not the “worst” for heat. 2012 finished in 8th place on the list, just below 6th and 7th places by a few days. Imagine what this diagram would show if we had 1000 years of climate data in which it would be certainly likely that many years experienced more record warmth than even the 1930s.

Recent Tornadoes

The image to the right from NOAA indicates we are in a very low tornado period in our county — in fact the current period (black line) is the lowest year-to-date value in the 60-year history. This of course is not a prediction that tornadoes will decline in the future nor that there will be few tornadoes the rest of this year. It is simply a recognition that the number of tornadoes can vary significantly from year to year and there is no long term trend (<http://www.spc.noaa.gov/wcm/adj.html>).



Recent Wildfires



the whole, the year is well below average as shown in the graphic to the left (data from the National Interagency Fire Center http://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html). A related metric is total snowfall in the Sierra which has also shown no trend since the Southern Pacific Railroad Company began measuring snowfall in 1878 (Christy 2012).

What does Extreme Weather really tell us?

The point about our lack of understanding of the causes of extreme weather was summed up in an article in *Nature* magazine with the title “Extreme Weather – Better models are needed before exceptional events can be reliably linked to global warming” (*Nature*, 20 September 2012, vol 489, pg 335-6.) The emphasis in the article agrees with my statement that our level of understanding about the climate system is so low that we cannot predict nor attribute unusual events to human emissions of greenhouse gases using models and/or limited data records. The article discusses the problem that current climate models are not “fit to inform legal and societal decisions” without further “enormous research” because at present they are not ready for such tasks.

The article notes that extreme events “have complex causes, involving anomalies in atmospheric circulation, levels of soil moisture and the like.” The comments of one scientist at a recent workshop on the topic indicated “the coarse and mathematically far-from-perfect climate models used to generate attribution claims ... are unjustifiably speculative, basically unverifiable and better not made at all.” Not all participants felt this way, however *Nature* reported that, “None of the industry and government experts at the workshop could think of any concrete example in which an attribution might inform business or political decision-making.” In other words, industry and government would prefer an accurate forecast over the notion of attributing that forecast to a particular cause. Unfortunately, the ability to make accurate forecasts is a long way off.

In the examples above, we don’t see increases in extreme events (which is also true for tornadoes, hurricanes, floods, etc. - see my House testimony of 31 March 2011) but we must certainly be ready for more to come as part of nature’s variability.

I am not using the examples above to prove the weather in the US is becoming less extreme. My point is that extreme events are poor metrics to use for detecting climate change. Indeed, because of their rarity (by definition) using extreme events to bolster a claim about any type of climate change (warming or cooling) runs the risk of setting up the classic “non-falsifiable hypothesis.” For example, we were told by the IPCC that “milder winter temperatures will decrease heavy snowstorms” (TAR WG2, 15.2.4.1.2.4). After the winters of 2009-10 and 2010-11, we are told the opposite by advocates of the IPCC position, “Climate Change Makes Major Snowstorms More Likely” (http://www.ucsusa.org/news/press_release/climate-change-makes-snowstorms-more-likely-0506.html).

The non-falsifiable hypotheses can be stated this way, “whatever happens is consistent with my hypothesis.” In other words, there is no event that would “falsify” the hypothesis. As such, these assertions cannot be considered science or in anyway informative since the hypothesis’ fundamental prediction is “anything may happen.” In the example above if winters become milder or they become snowier, the non-falsifiable hypothesis stands. This is not science.

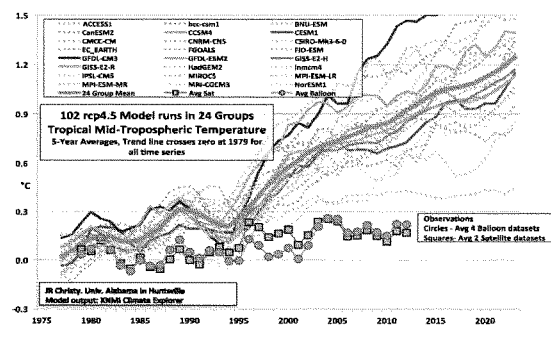
There are innumerable types of events that can be defined as extreme events – so for the enterprising individual (unencumbered by the scientific method), weather statistics can

supply an unlimited, target-rich environment in which to discover a “useful” extreme event. Thus, when the enterprising individual observes an unusual weather event, it may be tempting to define it as a once-for-all extreme metric to “prove” a point about climate change – even if the event was measured at a station with only 30 years of record. Extreme events happen, and their causes are intricately tied to the semi-unstable dynamical situations that can occur out of an environment of natural, unforced variability. In other words, Mother Nature has within her all the necessary tools to generate extreme events that exceed what we’ve seen in the past 50 years.

Science checks hypotheses (assertions) by testing specific, falsifiable predictions implied by those hypotheses. The predictions are to be made in a manner that, as much as possible, is blind to the data against which they are evaluated. It is the testable predictions from a specific set of hypotheses, otherwise known as climate model simulations, that run into trouble as shown below. Before going on to that test, the main point here is that extreme events do not lend themselves as being rigorous metrics for *convicting* human CO2 emissions of being guilty of causing them.

Utility of Climate Models

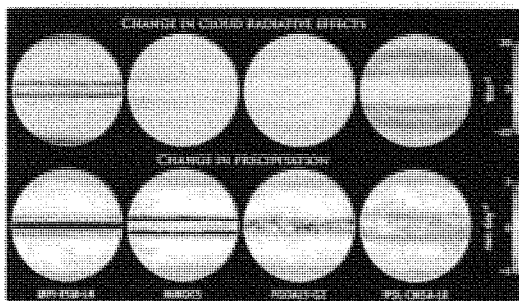
In the figure below I provide the 35-year record (1979-2013) of atmospheric temperature in the tropics – the key region in which climate models respond to greenhouse gas warming with a large and distinct signal. The focus on the tropics is important because of the consistent and significant warming that climate models indicate should have already occurred as a result of the increasing concentration of greenhouse gases we have put into the atmosphere. It also represents a part of the global atmosphere in which the critical water vapor and cloud feedbacks have major influences. The tropical atmosphere



is also a huge and easy target for modeling projects to hit if the physics are well represented. Since this warming should have taken place already, this provides for us a way to test the model simulations. There are 102 model runs represented in the figure, but I have organized them by the 24 types of models. The thick red line is the average of the 24 groups. Thin, solid lines are the six model groupings created by U.S. institutions and the dotted lines by those from outside the U.S. The observations are provided by six independent sources, with “balloons” being the average of the four balloon-borne datasets and “satellites” the average of the two groups which utilize satellite instrumentation.

The comparison shows that the very latest climate model simulations used in the IPCC Assessment released two weeks ago indicate that their response to CO₂ on average is 2 to 5 times greater than reality. In strict statistical testing, we can say that the models on average failed a simple hypothesis test to check whether they could represent the path the real world took on tropical atmospheric temperatures (see Douglass et al. 2007, McKittrick et al. 2010, 2011, Douglass and Christy 2013).

An extremely important paper was published in *Nature Climate Change* this past spring as one of the first studies to actually perform a test of model capabilities in a controlled experiment to understand the impacts on the critical processes that affect the way the temperature will change (Stephens and Bony, 2013). They simply ran four major climate models over an ocean-covered earth (i.e. a very simple earth) with the current ocean temperatures, then again with elevated ocean temperatures. The experiment would then reveal the impact of the extra warmth on the way the climate system operates, especially, clouds and rain because they have significant impacts on the warming processes. So, getting clouds and rain correct is necessary for long-term integrations. To their surprise, the four major models gave quite different results, both in terms of the magnitude *and of the sign* of the change in clouds and rain as shown in the figure. This is exactly the type of fundamental, rigorous evaluation that must be encouraged for other parts of the modeling enterprise. One can only conclude that at least three of the four models fail (if on the odd chance one is correct) to depict some of the fundamental processes of the Earth system. This result supports the comments in the paragraphs above which demonstrate the climate modeling enterprise must go “back to the basics” as stated in Stephens and Bony.



Basing scientific conclusions about climate change (or basing policy decisions about energy) on climate model output is risky given the “disconnect” between model simulations and the observed world.

The IPCC Summary for Policy Makers

Regarding the IPCC, please note that the IPCC was written by IPCC-selected scientists and that the document represents their opinions. Many of the conclusions are fine but some of the key ones do not represent the views of many in the broader climate community.

The head-line statement from the 2013 *Summary for Policy Makers* baffles me. It reads,

It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century.

First, the IPCC gives climate models the authority to distinguish “natural” from “human” caused climate change because instruments can’t. However, as demonstrated, these same models on average fail by a significant amount to reproduce the climate of the past 35 years (the years most directly impacted by rising greenhouse gas emissions.) But in conclusion, the IPCC now has ever more confidence that the models can distinguish “natural” from “human” change (change which the models cannot produce) in correct proportions. It doesn’t make sense to me.

Now, it is true that *in the models*, most of the warming in the past 50 years is due to greenhouse gases, but since the model-based warming did not occur in reality (by a significant amount), how can one claim that reality was driven by greenhouse gas warming?

I see two things here, (1) the need to go back to the drawing board on climate modeling with special attention to the causes of natural variations and with a rigorously independent verification program, and (2) the world community needs to be exposed to the real debates in climate science rather than statements amounting to a consensus of those who already agree with a certain consensus. These are sentiments I have been advocating for years in congressional testimony and which appear in an article published in *Nature* magazine (Christy, 2010 see after references).

In addition, I direct the reader to a supplement attached to this written testimony by Professor Judith Curry of Georgia Tech entitled, “IPCC Diagnosis – Permanent Paradigm Paralysis.” The title is an apt description of where the IPCC process has gone.

Seventeen Years Ago – House Committee on Science

Seventeen years ago, in March 1996, I testified before The House Science Committee regarding climate change. In that testimony I reported on the development of the deep layer temperature datasets from satellites that Roy Spencer, then of NASA now of UAHuntsville, and I had pioneered. Using these data, Richard McNider, also of UAHuntsville, and I wrote a paper in *Nature* magazine that indicated climate model simulations were warming the planet about 4 times faster than in reality (Christy and McNider 1994). Further analysis confirmed a rate in models 2 to 4 times faster than the real world.

It was clear at the time, and agreed to by most, that our understanding of how the climate system worked was poor and much more research was needed on observing the climate and on understanding its natural variations. I also noted that we should expect weather extremes to continue because that has been the nature of climate from the beginning.

One of my concluding statements was, and I quote,

Without a continuing program of research that places climate variations in proper perspective [i.e. natural climate variations - JRC] and reports with improving confidence on their causes, we will be vulnerable to calls for knee-jerk remedies to combat "climate change," which likely will be unproductive and economically damaging.

Now here we are, over 17 years later. It appears the nation has indeed enacted “knee-jerk” remedies to “combat climate change” through regulations on carbon dioxide. I warned the congress in 1996 that these would be “unproductive and economically damaging.” I have since provided testimony that demonstrates that these regulations will be “unproductive” regarding their impact on climate. I will leave it to economists to determine whether the regulations are also “economically damaging”, especially for the poorest among us.

The nation did indeed support some efforts to better observe the climate system, especially from space, to help in determining *what* was happening with the climate, and then begin to understand *why* changes are taking place. Other efforts seem to be falling by the wayside, including attention to the network of high quality surface monitoring stations. Simply put, we need to know *what* the climate is doing before claiming to know *why* it is doing what it is doing. Without observations we can not know *what* the climate is doing.

It is enlightening to examine the 35-year comparison of models and observations of atmospheric temperature in the tropics – the key region in which climate models respond to greenhouse gas warming with a large and distinct signal. This is an exceptionally large target for climate models to aim at, and it incorporates the critical water vapor and cloud feedbacks about which we know so little. The current record is now twice as long as was available when I testified in 1996 and the models are more complicated, expensive and numerous, representing an industry unto itself. The comparison shows that the very latest climate models’ tropical response to CO₂, on average, is still 2 to 4 times greater than reality, just as it was in 1996.

I believe we missed a tremendous opportunity 17 years ago to develop a better understanding of the climate system at the expense of creating a climate modeling industry. To compound the problem, I believe we failed to fund substantial projects to examine the output of climate models in an independent, objective and methodological way, i.e. there were no “red teams” funded to rigorously study the output of models on which the most expensive of regulations now rely.

The observing system which tells us what the climate is doing has suffered some losses in coverage and quality, especially at the surface. Most importantly, the diversion of basic science resources to study the effect of rising greenhouse emissions by modelling at the expense of understanding the ubiquitous variations of the natural system has left us still wondering what portion of the change is natural and what portion is human-caused.

References:

Christy, J.R. and R.T. McNider, 1994: Satellite greenhouse signal. *Nature*, 376, p. 325. Relevant quote, "Curve "e" reveals an upward trend of +0.09 °C per decade, or about one-quarter of the magnitude of climate model results."

Christy, J.R. 2010, "Open Debate, Wikipedia Style", *Nature*, vol 463, p 732. (See below).

Douglass, D.H., J.R. Christy, B.D. Pearson and S.F. Singer, 2007: A comparison of tropical temperature trends with model predictions. *International J. Climatology*, DOI: 10.1002/joc.1651.

Douglass, D.H. and J.R. Christy, 2013: Reconciling observations of global temperature change: 2013. *Eng. and Environ.*, 24, 415-419.

McKittrick, R.R., S. McIntyre and C. Herman, (2010): Panel and multivariate methods for tests of trend equivalence in climate data sets. *Atmos. Sci. Lett.*, 11(4), 270-277. doi: 10.1002/asl.290.

McKittrick, Ross, Stephen McIntyre and Chad Herman (2011) Correction to "Panel and Multivariate Methods for Tests of Trend Equivalence in Climate Data Series" *Atmospheric Science Letters* October 7 2011, DOI: 10.1002/asl.360.

radar screen of the world, there are many NGOs and other groups, even groups of scientists and institutions, that provide climate-change information in various forms and qualities, often lacking comprehensiveness and proper recognition of uncertainties. There is a strong pressure to provide 'just-in-time' scientific updates for policy-makers and stakeholders, as was the case in the preparations for the 2009 climate-change conference in Copenhagen. The IPCC must not yield to this pressure.

In this field of different and divergent forces, confusion may arise. An honest broker therefore is an asset. From my perspective, the IPCC has fulfilled this role with remarkable rigour and integrity. This role is now at risk, as the stakes are higher than ever before. The requirement that assessments are policy relevant but never policy prescriptions, as formulated in the *Principles Governing IPCC Work*, is of paramount importance. Our task is to inform the policy-makers and the public strictly in a 'what if' mode. Any other approach must be left to NGOs, negotiators or individuals. Only with strict adherence to procedures and to scientific rigour at all stages will the IPCC continue to provide the best and most robust information that is needed so much.

Produce more reports faster

Jeff Price

Lead author (AR3, AR4), director, climate-change adaptation, WWF United States

The IPCC is accepting nominations (until 12 March 2010) from governments and participating organizations for authors for its Fifth Assessment Report. One recommendation for the IPCC that could be implemented immediately is to have its coordinating lead authors and review editors selected.

Currently, authors are selected to represent 'a range of views, expertise, gender and geographical representation'. However, given the importance placed on these assessments, the most senior positions should be filled by the nominees most expert in their field, regardless of balance. These authors should be the most knowledgeable nominee about the range of topics in their chapter, best able to cooperatively work with a team of international scholars. Preferably, they should have previously been involved in an IPCC assessment and be familiar with IPCC standards and methodologies. Geographic and gender balance should then

be used in selection of lead authors. The level of work required in preparing an assessment is large. Increasing the number of lead authors would provide better balance and give more scientists the ability to participate in the process.

A new class of short, rapidly prepared, peer-reviewed reports is also needed. At present, publication options include supplemental material (no peer review required), technical papers (based on existing assessments) or assessments and special reports that undergo two reviews (expert and government/expert, usually taking more than two years to complete). For topics of emerging importance or uncertainty, we need reports based on expert meetings and literature syntheses that undergo only a single round of extensive peer review with review editors oversight before publication. The IPCC should also expand the number of specialist task forces, task groups and hold more expert meetings to provide additional scientific review and oversight for the broadening array of models (including model comparisons and validation) and methodologies used in emissions reporting, estimating and monitoring impacts, and in developing assessments and adaptation plans.

Finally, the current period between assessments is too long. One option would be for the IPCC, or another body, to produce an annual review, assessment and synthesis of the literature for policy-makers (for example, three annual review volumes with a synthesis chapter in each volume) prepared by experts in the field. Although the editors of the volumes should ideally be drawn from past IPCC authors and editors, the review articles could be submitted by any author, as they would for a journal, with appropriate peer review and assessment for publication.

Open debate: Wikipedia-style

John R. Christy

Lead author (AR3), University of Alabama in Huntsville, USA

Since 1992 I have served as an IPCC contributor and in 2001, as a lead author. My experience has left me of the firm conviction that the IPCC should be removed from UN oversight.

The IPCC selects lead authors from the pool of those nominated by individual governments. Over time, many governments nominated only authors who were aligned with stated policy. Indeed, the selections for the IPCC Fourth

Assessment Report represented a disturbing homogeneity of thought regarding humans and climate.

Selected lead authors have the last word in the review cycle and so control the message, often ignoring or marginalizing dissenting comments. Consensus and manufactured confidence ensued. The recent leaking of e-mails from the Climatic Research Unit at the University of East Angles in Norwich, UK, put on display the unenviable cycle of marginalizing different viewpoints. Now several errors of overstatement, such as that of the melting rate of the Himalayan glaciers, have been exposed.

Unfortunately, prestigious media, including *Nature*, became cheerleaders for these official reports, followed then by governments trying to enact policies that drastically reduced emissions to stop global warming while increasing energy costs.

I recommended last year that the next IPCC report invites published authors to write about the evidence for low climate sensitivity and other issues. The IPCC then would be a true reflection of the heterogeneity of scientific views, an honest broker, rather than an echo chamber. My recommendation assumed a business-as-usual IPCC process.

However, voluminous printed reports, issued every six years by government-nominated authors, cannot accommodate the rapid and chaotic development of scientific information today. An idea we pitched a few years ago that is now worth revisiting was to establish a living, 'Wikipedia-IPCC'. Groups of four to eight lead authors, chosen by learned societies, would serve in rotating, overlapping three-year terms to manage sections organized by science and policy questions (similar to the Fourth Assessment Report). The authors would strike a balance between the free-for-all of true science and the need for consensus statements.

Controversies would be refereed by the lead authors, but with input from all sides in the text, with links to original documents and data. The result would be more useful than occasional big books and would be a more honest representation of what our fledgling science can offer. Defining and following rules for this idea would be agonizing, but would provide greater openness.

The truth, and this is frustrating for policy-makers, is that scientists' ignorance of the climate system is enormous. There is still much messy, contentious, snail-paced and now hopelessly transparent work to do.

See also *Perspectives*, page 747.
Have your say on the future of the IPCC at go.nature.com/brzWaa.

<http://judithcurry.com/2013/09/28/ipcc-diagnosis-permanent-paradigm-paralysis/>

IPCC diagnosis – permanent paradigm paralysis

Posted on [September 28, 2013](#) | [577 Comments](#)

by Judith Curry

Diagnosis: paradigm paralysis, caused by motivated reasoning, oversimplification, and consensus seeking; worsened and made permanent by a vicious positive feedback effect at the climate science-policy interface.

In a previous [post](#), I discussed the IPCC's diagnosis of a planetary fever and their prescription for planet Earth. In this post, I provide a diagnosis and prescription for the IPCC.

In the 1990's, the world's nations embarked on a path to prevent dangerous anthropogenic climate change by stabilization of the concentrations of atmospheric greenhouse gases, which was codified by the 1992 UN Framework Convention on Climate Change (UNFCCC) treaty. The IPCC scientific assessments play a primary role in legitimizing national and international policies aimed at reducing greenhouse gas emissions. This objective has led to the IPCC assessments being framed around identifying anthropogenic influences on climate, dangerous environmental and socio-economic impacts of climate change, and stabilization of CO₂ concentrations in the atmosphere.

At the time of establishment of the UNFCCC, there was as yet no clear signal of anthropogenic warming in the observations, as per the IPCC First Assessment Report (FAR) in 1990. It wasn't until the IPCC's Second Assessment Report in 1995 that a '*discernible*' human influence on global climate was identified. The scientific support for the UNFCCC treaty was not based on observations, but rather on our theoretical understanding of the greenhouse effect and simulations from global climate models. In the early 1990's there was the belief in the feasibility of reducing uncertainties in climate science and climate models, and a consensus seeking approach was formalized by the IPCC. General circulation climate models became elevated to the central role by policy actors and scientists from other fields investigating climate change impacts and applications – this has in turn has elevated the role and position of these climate models in climate change research. Very substantial investments have been made in further

developing climate models, with the expectations that these models will provide actionable information for policy makers.

In 2006/2007, climate change had soared to the top of the international political agenda, as a result of Hurricane Katrina, Al Gore's *An Inconvenient Truth*, publication of the IPCC AR4 in 2007, and award of the Nobel Peace Prize to Al Gore and the IPCC. It was claimed that the science was settled, and that it clearly demanded radical policy and governmental action to substantially cut CO2 emissions.

Symptoms of the disease

Seven years later, with the release of the IPCC AR5, we find ourselves between the metaphorical rock and a hard place with regards to climate science and policy:

- as temperatures have declined and climate models have failed to predict this decline, the IPCC has gained confidence in catastrophic warming and dismisses the pause as unpredictable climate variability
- substantial criticisms are already being made of the IPCC AR5 Reports as well as of the IPCC process itself; IPCC insiders are bemoaning their loss of their scientific and political influence; the mainstream media seems not to be paying much attention to the AR5 SPM; and even IPCC insiders are realizing the need for a radical change
- global CO2 emissions continue to increase at higher than expected rates and a growing realization of the infeasibility of meeting emissions targets
- failure of the UNFCCC Conference of Parties to accomplish much since 2009 beyond agreeing to establish future meetings
- Growing realization that you can't control climate by emissions reductions
- European countries and Australia are backing away from their emission reductions policies as they realize their economic cost and political unpopularity
- increasing levels of shrillness on both sides of the political debate, with the 'warm side' steeped in moral panic and hyperbole

And finally:

- after several decades and expenditures in the bazillions, the IPCC still has not provided a convincing argument for how much warming in the 20th century has been caused by humans.
- the politically charged rhetoric has contaminated academic climate research and the institutions that support climate research, so that individuals and institutions have become advocates; scientists with a perspective that is not consistent with the consensus are at best marginalized (difficult to obtain funding and get papers published by 'gatekeeping' journal editors) or at worst ostracized by labels of 'denier' or 'heretic.'

- decision makers needing regionally specific climate change information are being provided by the climate community with either nothing or potentially misleading predictions from climate models.

Diagnosis of the cause of the disease

How and why did we land between a rock and a hard place on the climate change issue? There are probably many contributing reasons, but the most fundamental and profound reason is arguably that both the problem and solution were vastly oversimplified back in 1990 by the UNFCCC/IPCC, where they framed both the problem and the solution as irreducibly global. This framing was locked in by a self-reinforcing consensus-seeking approach to the science and a 'speaking consensus to power' approach for decision making that pointed to only one possible course of policy action – radical emissions reductions. The climate community has worked for more than 20 years to establish a scientific consensus on anthropogenic climate change. The IPCC consensus building process played a useful role in the early synthesis of the scientific knowledge. However, the ongoing scientific consensus seeking process has had the unintended consequence of oversimplifying both the problem and its solution and hyper-politicizing both, introducing biases into both the science and related decision making processes.

In their *Wrong Trousers* essay, Prins and Rayner argue that we have made the wrong cognitive choices in our attempts to define the problem of climate change, by relying on strategies that worked previously with ozone, sulphur emissions and nuclear bombs. While these issues may share some superficial similarities with the climate change problems, they are 'tame' problems (complicated, but with defined and achievable end-states), whereas climate change is 'wicked' (comprising open, complex and imperfectly understood systems). For wicked problems, effective policy requires profound integration of technical knowledge with understanding of social and natural systems. In a wicked problem, there is no end to causal chains in interacting open systems, and every wicked problem can be considered as a symptom of another problem; if we attempt to simplify the problem, we become risk becoming prisoners of our own assumptions.

The framing of the climate change problem by the UNFCCC/IPCC and the early articulation of a preferred policy option by the UNFCCC has arguably marginalized research on broader issues surrounding climate variability and change, resulting in an overconfident assessment of the importance of greenhouse gases in future climate change and stifling the development of a broader range of policy options. The result of this simplified framing of a wicked problem is that we lack the kinds of information to more broadly understand climate change and societal vulnerability.

Paradigm paralysis is the inability or refusal to see beyond the current models of thinking. The vast amount of scientific and political capital invested in the IPCC has become self-reinforcing, so it is not clear how to move past this paralysis as long as the IPCC remains in existence. The wickedness of the climate change problem makes it difficult to identify points of irrefutable failure in either the science or the policies,

although the IPCC's insistence that the pause is irrelevant and temporary could provide just such a refutation if the pause continues. In any event, there is a growing realization of that neither the science or policy efforts are making much progress, and particularly in view of the failure climate models to predict the stagnation in warming, and that perhaps it is time to step back and see if we can do a better job of understanding and predicting climate variability and change and reducing societal and ecosystem vulnerabilities.

Broader implications of the disease

Specifically with regards to climate research, for the past decade most of the resources have been expended on providing projections of future climate change using complex Earth system models, assessing and interpreting the output of climate models, and application of the output of climate models by the climate impacts community.

The large investment in climate modeling, both in the U.S. and internationally, has been made with the expectation that climate models will support decision making on both mitigation and adaptation responses to climate change. So, are these complex global climate models especially useful for decision makers? The hope, and the potential, of climate models for providing credible regional climate change scenarios have not been realized.

With the failure of climate models to simulate the pause and regional climate variability, we have arguably reached the point of diminishing returns from this particular path of climate modeling – not just for decision support but also for scientific understanding of the climate system. In pursuit of this climate modeling path, the climate modeling community — and the funding agencies and the policy makers — have locked themselves into a single climate modeling framework with a focus on production runs for the IPCC, which has been very expensive in terms of funding and personnel. An unintended consequence of this strategy is that there has been very little left over for true climate modeling innovations and fundamental research into climate dynamics and theory — such research would not only support amelioration of deficiencies and failures in the current climate modeling systems, but would also lay the foundations for disruptive advances in our understanding of the climate system and our ability to predict emergent phenomena such as abrupt climate change.

As a result, we've lost a generation of climate dynamicists, who have been focused on climate models rather than on climate dynamics and theory that is needed to understand the effects of the sun on climate, the network of natural internal variability on multiple time scales, the mathematics of extreme events, and predictability of a complex system characterized by spatio-temporal chaos. New structural forms are needed for climate models that are capable of simulating the natural internal variability of the coupled ocean-atmosphere system on timescales from days to millennia and that can accurately account for the fast thermodynamic feedback processes associated with clouds and water vapor.

Hoping and expecting to rely on information from climate models about projected regional climate change to guide adaptation response has diverted attention from using observational, historical and paleoclimate data from the region to more usefully develop the basis for future scenarios. Further, increased scientific focus on subseasonal (weeks) and seasonal (months) weather/climate forecasts could produce the basis for tactical adaptation practices with substantial societal benefits.

Securing the common interest on local and regional scales (referred to by Brunner and Lynch as “adaptive governance”) provides the rationale for effective climate adaptation strategies. This requires abandoning the irreducibly global consensus seeking approach in favor of open debate and discussion of a broad range of policy options that stimulate local and regional solutions to the multifaceted and interrelated issues surrounding climate change.

The IPCC needs to get out of the way so that scientists and policy makers can better do their jobs.

Conclusion

The diagnosis of paradigm paralysis seems fatal in the case of the IPCC, given the widespread nature of the infection and intrinsic motivated reasoning. We need to put down the IPCC as soon as possible – not to protect the patient who seems to be thriving in its own little cocoon, but for the sake of the rest of us whom it is trying to infect with its disease. Fortunately much of the population seems to be immune, but some governments seem highly susceptible to the disease. However, the precautionary principle demands that we not take any risks here, and hence the IPCC should be put down.



Office of the Director
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Richard A. Bajura

October 27, 2013

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Testimony on

Technological Requirements for Meeting New Source Performance Standards (NSPS) for
Emissions of Carbon Dioxide from Electric Generating Units (EGU)

Presented by
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October 29, 2013

Members of the Subcommittees on Environment and Energy:

Thank you for the opportunity to offer testimony on the New Source Performance Standards (NSPS) being considered by the U. S. Environmental Protection Agency (EPA) under Section 111 of the Clean Air Act of 1970.

EPA identified the following key factors in their criteria for the proposed rulemaking:

- Feasibility – whether the system of emissions reduction is technically feasible
- Costs – whether the costs of the system are reasonable
- Size of the Emissions Reductions – amount of CO₂ emissions reduction resulting from the system
- Technology Development – whether the system promotes implementation and further development of technology

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My testimony will focus on coal-fired electricity generation. Topics discussed are lessons learned about technology development, the stage of development of CCS (carbon capture and storage) technologies, technology development in other nations, and the need for federal support for research and demonstration projects.

Lessons Learned in Technology Development

Coal Plant Deployments and Performance

Thomas Sarkus of the National Energy Technology Laboratory (NETL) provided an overview of the U. S. Government's program in developing Clean Coal Technologies in a presentation at the 2013 Pittsburgh International Coal Conference.¹

He noted that pulverized coal boilers were commercialized in the 1920s and 1930s, and that there are about 5,000 units operating world-wide with approximately 1,100 operating in the U. S. Fluidized bed coal combustion boilers were commercialized in the 1970s-1980s, and there are around 500 units operating world-wide with about 150, mostly small, units in the U.S. However, for Integrated Gasification Combined-Cycle (IGCC) coal power plants, there are only nine units operating world-wide and only four in the U. S.

He also shared his experience as a project manager for demonstration projects. He observed that technology performance often degrades with scale-up. In other words, a technology that looks promising in a small laboratory setting may not achieve the predicted operating performance at commercial scales. We often discover that new factors arise in larger systems that were not apparent in laboratory experiments. Also, project financing, cost of a system, and meeting construction schedules are all important considerations in determining if a technology is ready for commercial deployment.

First and Nth of a Kind Plants

In studying the development of technology for full scale systems that are deployed in large numbers such as the 5,000 pulverized coal plants referenced above, engineers have been able to quantify concepts that are called technology learning curves. Typically the highest cost for a full scale unit is the first of a kind (FOAK). As more copies of the same design are built and debugged, the performance of the design will generally improve and the cost for construction and operation will decrease. EPA is counting on the learning curve effect in making its projections for future performance and cost of CCS-based coal plants in establishing the proposed emissions limits on coal systems.

Care is needed, however, in defining FOAK units and NOAK (Nth of a kind) units. Large scale units are usually based on a particular manufacturer's technology. Observations in the DOE/NETL-34/042211 report² illustrate the example that although gasification technologies are similar, it is unlikely that one vendor will share its experience with rivals. They comment that the E-Gas IGCC system (Conoco-Phillips technology) proposed for the Excelsior project is only a second of a kind

¹ Thomas Sarkus, Lessons Learned from U. S. Government Support of Clean Coal Technologies, International Pittsburgh Coal Conference, 2013, Beijing

² Quality Guidelines for Energy System Studies – Technology Learning Curve (FOAK and NOAK), DOE/NETL-341-042211, January, 2012 National Energy Technology Laboratory

IGCC based on the Wabash project experience. Little or no benefit will accrue to the E-Gas designers from the Pinion Pines (KRW technology) plant that failed, the Polk (GEE technology) in Florida, or the Buggenum and Puertollano (Shell) projects. Since the Excelsior project did not go forward to construction, of the nine IGCC plants cited by Sarkus above, it is possible they could all be FOAK plants. In this case, we would have only one, high-cost demonstration of each type that still has many major design parameters to be worked out to bring costs down and performance up to the values for an Nth of a kind plant.

We must also recognize that, unlike natural gas that is readily available nationally as a uniform commodity, coal varies from region to region in its characteristics. Coal power plants must be designed to accommodate the particular characteristics of the coal supplied. Hence, a large number of plants must be tested over a range of coals to bring a technology to a state of commercial readiness whereby a financial backer is willing to provide financing and a technology vendor is willing to guarantee system performance under penalty of paying the costs for operation of underperforming units.

Traditional pulverized coal plants have achieved demonstrated technology status. New designs such as ultra-supercritical systems or oxygen fired (oxyfuel) systems have not achieved that level of performance attainment given their relatively new introduction as a next-generation technology. Some of EPA's criteria in the NSPS proposal are based on only a FOAK system rather than a NOAK system. Experience has shown that FOAK systems are not commercially available and additional iterations on the technology are required to achieve commercial status.

Technology Integration

Technology learning curve theory also includes the proposition that some plants may have components of a technology that can be considered as Nth of a kind, but have critical components that are new and first of a kind. Hence, a pulverized coal technology plant that uses a new technology for carbon capture, such as a membrane, could be considered as a FOAK kind of a plant for the following reason. Control and operational problems usually have to be overcome due to the difficulties of integrating the new component with an older component that was not originally designed to be a good interface with advanced technology systems.

Integrating CCS with a power generation plant introduces complexities. The full system must be designed to handle contingencies that may occur. What if access to the carbon storage reservoir becomes unavailable - what happens to the CO₂ captured? Alternatively, if the plant goes off line and the reservoir performance is based on continuous injection of CO₂ to avoid damage to the long term performance of the reservoir, where does the plant or reservoir operator get the CO₂ needed?

CO₂ injection studies into geologic reservoirs have only been carried out at scales of tens of thousands of tons of CO₂ per site. Larger scale studies are underway. For a full scale operating plant, a million tons of CO₂ per year may be generated and would need to be injected to handle the plant's output. We need to validate geologic storage at this scale to prove out an integrated system with a CO₂ capture plant. FutureGen, which is scheduled to be on line in 2017, will integrate the operation of the Meredosia plant with the storage reservoir operations. Integration of all components will be a challenge. This experiment will be a FOAK kind of plant in the context of the present discussion. Since this plant is still not in operation, we have not yet achieved a FOAK status with regard to developing a lessons learned notebook on demonstrating the technology.

Status of Carbon Capture Technologies

Many of the currently discussed post-combustion carbon capture technologies are based on the use of amines or chilled ammonia (recent technology developed by Alstom). The amine technology was originally developed for the chemical industry. In a chemicals plant, it is often necessary to remove CO₂ from the process stream. Amine systems have high operating costs. Energy is required to disassociate the captured CO₂ from the amine in order to use it again in the process stream. Chemical plants producing high value products can afford the extra expense since costs are recovered in the price of the product.

The price of the electricity is one of the lowest "value-added" components of a multi-product plant – i.e., for a polygeneration plant. Here fertilizer could be made, the captured CO₂ sold for enhanced oil recovery (EOR) and process steam sold for district heating. Electricity is a smaller component of the overall outputs of the plant. The Summit and HECA plants referenced in the EPA proposal are plants of this type.

The cost of operating an amine technology for carbon capture in a stand-alone power plant is relatively more than in a chemicals plant. In a plant dedicated solely to generating electricity, the cost of using the traditional amine technology is generally summarized as:

- 45-70% increase in the cost of electricity
- 35-110% increase in capital costs
- 15-21% decrease in the plant's electricity output compared to operations before carbon capture equipment was added

While it has been demonstrated that carbon capture using amines will work technologically, this type of technology is not cost competitive for a stand-alone power generation plant as compared to a chemical refinery or a polygeneration plant. Using newer advanced technologies such as membranes or ionic liquids, or revised power cycles that minimize the steps required to separate and capture CO₂ are ways to reduce costs. However, these are newer technologies that have not been demonstrated at commercial scales.

Legal and Social Issues

The large number of legal and social issues associated with developing a carbon sequestration site can delay construction and must be factored into the assessment of a technology's readiness for deployment. Data from many sources show that the cost of electricity from new natural gas plants would be low compared to new coal fired plants. Around 22% of the total cost of electricity for a natural gas combined-cycle plant is the capital cost, whereas capital costs could be as much as 50% of the total cost of electricity for a coal IGCC plant. Given the large fraction of a coal plant's cost that is tied up in debt service for financing and the long operating time over which payback may occur (typically 30-40 years), it is important that project construction occur on a timely basis. Otherwise, the increased cost of capital over the delay period would raise the cost of electricity even higher for the coal plant.

Practice has shown, however, that the following factors often add to cost increases that affect financing, technology development, and timeliness for the construction of coal plants:

- Regulatory Issues - permitting, treatment of CO₂, ...

- Infrastructure Development – pipeline construction and permitting, ...
- Human Capital – need for developing a new workforce skilled in building and managing the equipment inside the plant boundary and handling the transport and storage of CO₂ in the field,
- Legal Framework – liability for the CO₂ once it is injected, ownership of the pore space underground, ownership of the CO₂ once injected, legal hassles between states over cross-boundary transport of CO₂ underground,
- Public Acceptance – NIMBY (NIMBY perception by the general public
- Uncertainty – uncertainty about future legislation on CO₂ emissions,

Carbon storage in geologic reservoirs must also overcome the concerns about injecting fluid into a space that is already crowded as compared to EOR injections. Using CO₂ injection for enhanced oil recovery has been ongoing for a long time. In EOR, the injection of CO₂ can be likened to re-pressurizing the reservoir to an original condition and thereby counterbalances the subsidence that could occur from removing the oil. For geologic storage in saline aquifers, the injection amounts to over-pressurizing the formation, promoting migration of fluids to other areas. This result generates more concerns than for EOR processes. These factors lead to delays in permitting and construction, and hence must be considered as a part of the cost and technical readiness of a technology. These issues have not been adequately resolved to attract power plant financiers to invest money in projects with CCS.

Demonstration Status of CCS Technologies

The following comments address the theme of the present hearing, namely, has the commercial deployment of CCS technologies been "adequately demonstrated" to meet the key criteria of EPA cited above.

Feasibility

As noted above, the feasibility of using amine solutions for capturing CO₂ has long been demonstrated in the chemicals industry. While technically feasible, the cost of the amine solution process is very expensive for power generation. The use of these amine solutions over extended duty cycles in coal gas atmospheres needs further development.

System integration issues are also a concern with regard to the operation of amine towers. The process works by trickling the solution down a wall that is exposed to the CO₂ gas. Most chemical plants operate with one tower where instabilities in the falling film of amine caused by the upward rush of the CO₂-laden air can be managed based on operating experience. For a large scale power plant, multiple amine towers will be required. Fluid flow instabilities in one tower can affect the operation of adjacent towers due to switching air flows in reaction to the tower upsets. This situation is one example of integration studies that need to be performed on large scale demonstration units before the technology can be said to be adequately demonstrated at commercial scale.

Coal-based IGCC systems have not been demonstrated in sufficient numbers as noted above, especially in carbon capture applications. Many of the examples cited in the EPA proposal have been for polygeneration systems. Additional research and demonstration is needed for stand-alone IGCC power generation systems.

Long-term storage of CO₂ in geological reservoirs has not been demonstrated for large volumes of injected fluid on a continuous basis.

Cost

As noted above, costs associated with amine capture are high compared to costs that are expected to be realized when advanced carbon capture technologies come to fruition.

Additional costs are incurred due to the social and legal aspects of permitting a CCS power plant – storage field operation. These factors must be considered in assessing the cost of compliance with the 1,100 pounds of CO₂ per megawatt hour standard proposed by EPA.

The latest pulverized coal plant that is an indication of the state of pulverized coal technology is the Turk plant, which is estimated to operate at a rate of 1,800 pounds of CO₂ per megawatt hour. A significant cost and performance penalty will apply to reduce the emissions to 1,100 pounds per megawatt hour. Large scale operations of a coupled plant and storage system have not been operated sufficiently long to develop cost estimates of a combined operation.

The cost of using currently available carbon capture technologies is considered to be too expensive to be competitive for coal based systems.

Size of Emissions Reductions

Given the uncertainties associated with questions of feasibility and costs as noted above, it is likely that few if any coal plants will be deployed in the time frame proposed by EPA. Hence, the present proposal will not lead to significant reductions as stated by EPA.

However, if the proposal could be modified to delay the lower CO₂ emissions requirement, there may be opportunities to propose new plants based on technologies that could be developed in the near future. Therefore, emissions reductions could result from a delay in implementing the standard.

Technology Development

As above, if no new plants would be built, there is no driver for developing technology for CO₂ capture and storage. It is desirable to maintain a diverse portfolio of fuels to meet our energy needs. Programs that would encourage technology development are essential. Phasing in the standards over a longer time would provide a window for developing advanced technologies that could be demonstrated on a timely basis to achieve the goals of the EPA proposal.

Comments on Global Technology Development

The use of coal for power generation and chemicals production (liquid fuels, fertilizer, chemical products,) in China has passed the U. S. usages and the gap between the U. S. and China will continue to widen with respect to coal technologies.

Chinese planners have been willing to make investments in new technologies through support of fundamental and engineering scale research, and development of coal-based systems from large pilot plant operations to full scale development. These investments have been made by the government or by government-owned industries.

As a result, China has taken a leadership role in coal-to-chemicals and coal-to-liquid fuels production technologies, and is rapidly developing technologies for advanced power generation with coal systems and carbon storage. Their next Five Year plan will include a focus on government supported CCS activities, with active involvement in geological storage research and demonstrations.

Federal Support for Research and Demonstration Projects

The U. S. research and development program for coal-based technologies has made progress in developing advanced pulverized coal and gasification systems that include higher efficiency processes and carbon capture and storage applications. However, more progress needs to be made to achieve the goals proposed by EPA. A robust federal research, development and demonstration program is needed.

Advances in fundamental research in developing new materials, new control and integration technologies, and advanced cycles offer promise for higher efficiency in terms of power generation and in carbon capture and storage. Demonstration programs are more-or-less at the first of a kind status in developing ideas to the scale where their commercial viability and performance can be evaluated. In both of these areas, we need continued and strong support from Congress to ensure continued development of coal as a viable fuel for our nation.

Efficient coal technologies will ensure our energy and economic security by maintaining diversity in our portfolio of fuels. As a nation, we can show global leadership by developing and exporting technologies that address mounting concerns about carbon emissions. A risk we take by not acting in a strong leadership manner is that we will be buying our technology from other nations who are more aggressive in developing their technology base.

Closing Comments

Without the building of new plants, no technology advancement would occur to demonstrate the commercial readiness of new carbon capture and storage plants. Investments in a strong research, development and demonstration program, coupled with a delayed phase-in of the standards proposed by EPA would provide improved opportunities for technologists to meet the challenges proposed to us by EPA to improve our environment and economic competitiveness through advanced coal technologies. I recommend your consideration for both of these approaches.

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
RANKING MEMBER

ONE HUNDRED THIRTEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115
Majority (2013) 215-2827
Minority (2013) 215-2643
December 13, 2013

The Honorable Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Dear Acting Administrator McCabe:

Thank you for appearing before the Subcommittee on Energy and Power on Thursday, November 14, 2013, to testify at the hearing entitled "EPA's Proposed GHG Standards for New Power Plants and H.R. __, Whitfield-Manchin Legislation."


Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

Also attached are Member requests made during the hearing. The format of your responses to these requests should follow the same format as your responses to the additional questions for the record.

To facilitate the printing of the hearing record, please respond to these questions and requests by the close of business on Friday, January 10, 2014. Your responses should be e-mailed to the Legislative Clerk in Word format at Nick.Abraham@mail.house.gov and mailed to Nick Abraham, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, D.C. 20515.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,


Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby L. Rush, Ranking Member,
Subcommittee on Energy and Power

Attachments



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR - 2 2014

OFFICE OF CONGRESSIONAL
AND INTERGOVERNMENTAL RELATIONS

The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Whitfield:

Thank you for your letter of December 13, 2013, to Acting Assistant Administrator Janet McCabe requesting responses to Questions for the Record following the November 14, 2013, hearing before the Subcommittee on Energy and Power entitled, "EPA's Proposed GHG Standards for New Power Plants and H.R. Whitfield-Manchin Legislation."

The responses to the questions are provided as an enclosure to this letter. If you have any further questions please contact me, or your staff may contact Kevin Bailey at bailey.kevinj@epa.gov or (202) 564 2998.

Sincerely,

A handwritten signature in dark ink, appearing to read "Nichole Distefano".

Nichole Distefano
Deputy Associate Administrator
for Congressional Affairs

November 14 2013 House Energy and Commerce EPA Questions for the Record

Attachment 1-Member Request for the Record

During the hearing, members asked you to provide information for the record and you indicated that you would provide that information. For your convenience, descriptions of the requested information based on the relevant excerpts from the hearing transcript are provided below.

The Honorable Robert E. Latta

1. During the hearing, you agreed to provide the committee with a list of facilities that were using scrubbers when the standards developed to require the use of scrubbers was implemented and made final in the late 1970s. Please provide a list of these facilities.

The following table provides a list of electricity generating units with scrubbers that were operating or under construction at the time of the 1978 proposed SO₂ NSPS. This list includes some scrubbers that were designed as test facilities rather than permanent installations. See "Electric Utility Steam Generating Units; Background Information for Proposed SO₂ Emission Standards" (see web link) for more information.

<http://nepis.epa.gov/Exe/ZyNET.exe/2000Y6K1.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1976+Thru+1980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5Cindex%20Data%5C76thru80%5CTxt%5C00000007%5C2000Y6K1.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=i75g8/r75g8/x150v150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionI&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyURL>

Unit	Location	Company	Status
Reid Gardner No. 1	Moapa, NV	Nevada Power Company	Operational
Reid Gardner No. 2	Moapa, NV	Nevada Power Company	Operational
Reid Gardner No. 3	Moapa, NV	Nevada Power Company	Operational
D.H. Mitchell	Gary, IN	Northern Indiana Public Service Company	Operational
Sherburne County No. 1	Becker, MN	Northern States Power Company	Operational
Sherburne County No. 2	Becker, MN	Northern States Power Company	Operational
Bruce Mansfield No. 1	Shippingport, PA	Pennsylvania Power Company	Operational
Bruce Mansfield No. 2	Shippingport, PA	Pennsylvania Power Company	Under Construction
Eddystone No. 1A	Eddystone, PA	Philadelphia Electric Company	Operational
San Juan No. 1	Waterflow, NM	Public Service Company of New Mexico	Under Construction
San Juan No. 2	Waterflow, NM	Public Service Company of New Mexico	Under Construction
Winyah No. 2	Georgetown, SC	South Carolina Public Service Authority	Under Construction
Marion No. 4	Marion, IL	Southern Illinois Power Cooperative	Under Construction
R.D. Morrow No. 1	Hattiesburg, MS	South Mississippi Electric Power Assoc.	Under Construction
R.D. Morrow No. 2	Hattiesburg, MS	South Mississippi Electric Power Assoc.	Under Construction
Southwest No. 1	Springfield, MO	Springfield City Utilities	Operational
(John Twitty)			

Shawnee	Paducah, KY	Tennessee Valley Authority	Operational
Shawnee	Paducah, KY	Tennessee Valley Authority	Operational
Widows Creek No. 8	Bridgeport, AL	Tennessee Valley Authority	Operational
Martin Lake No. 1	Tatum, TX	Texas Utilities Company	Under Construction
Martin Lake No. 2	Tatum, TX	Texas Utilities Company	Under Construction
Monticello No. 3	Mount Pleasant, TX	Texas Utilities Company	Under Construction
Hunter No. 1	Emery Co., UT	Utah Power and Light Company	Under Construction
Huntington No. 1	Price, UT	Utah Power and Light Company	Under Construction
Tombigbee No. 2 (Lowman)	Jackson, AL	Alabama Electric Cooperative, Inc.	Under Construction
Pleasants No. 1	Belmont, WV	Allegheny Power System, Inc.	Under Construction
Pleasants No. 2	Belmont, WV	Allegheny Power System, Inc.	Under Construction
Apache No. 2	Cochise, AZ	Arizona Electric Power Cooperative, Inc.	Under Construction
Apache No. 3	Cochise, AZ	Arizona Electric Power Cooperative, Inc.	Under Construction
Cholla No. 1	Joseph City, AZ	Arizona Public Service Company	Operational
Cholla No. 2	Joseph City, AZ	Arizona Public Service Company	Under Construction
Reid No. 2	Robards, KY	Big Rivers Electric Cooperation	Under Construction
Duck Creek No. 1	Canton, IL	Central Illinois Light Company	Under Construction
Newton No. 1	Newton, IL	Central Illinois Public Service	Under Construction
Conesville No. 5	Conesville, OH	Columbus and Southern Ohio Electric Co.	Operational
Conesville No. 6	Conesville, OH	Columbus and Southern Ohio Electric Co.	Under Construction
Powerton No. 5	Pekin, IL	Commonwealth Edison Company	Under Construction
Will County No. 1	Romeoville, IL	Commonwealth Edison Company	Operational
Erama Power Station	Erama, PA	Duquesne Light Company	Operational
Phillips Power Station	South Heights, PA	Duquesne Light Company	Operational
Petersburg No. 3	Petersburg, IN	Indianapolis Power and Light Company	Under Construction
Hawthorn No. 3	Kansas City, MO	Kansas City Power and Light Company	Operational
Hawthorn No. 4	Kansas City, MO	Kansas City Power and Light Company	Operational
La Cygne No. 1	La Cygne, KS	Kansas City Power and Light Company	Operational
Jeffery No. 1	St. Mary, KS	Kansas Power and Light Company	Under Construction
Jeffery No. 2	St. Mary, KS	Kansas Power and Light Company	Under Construction
Lawrence No. 4	Lawrence, KS	Kansas Power and Light Company	Operational
Lawrence No. 5	Lawrence, KS	Kansas Power and Light Company	Operational, Under Mod.
Green River No. 1, 2, 3	Central City, KY	Kentucky Utilities Company	Operational
Cane Run No. 4	Louisville, KY	Louisville Gas & Electric Company	Operational
Cane Run No. 5	Louisville, KY	Louisville Gas & Electric Company	Under Construction
Mill Creek No. 3	Louisville, KY	Louisville Gas & Electric Company	Under Construction
Paddys Run No. 6	Louisville, KY	Louisville Gas & Electric Company	Operational
Milton R. Young No. 2	Center, ND	Minnkota Power Cooperative Inc.	Under Construction
Colstrip No. 1	Colstrip, MT	Montana Power Company	Operational
Colstrip No. 2	Colstrip, MT	Montana Power Company	Operational

The Honorable David B. McKinley

1. During the hearing, you agreed to respond in writing regarding how it is that you are testifying that carbon capture and storage (CCS) technologies for coal plants are available now, when back in November 2011, EPA Administrator Lisa Jackson was quoted as stating that CCS technology was "maybe a decade or more" away from being commercially available. The Department of Energy

similarly put out their own report saying the technology wouldn't be commercially viable until 2020. Please explain why you disagree with the projections of Administrator Jackson and the Department of Energy.

The EPA has determined that CCS is technically feasible for new coal-fired power plants, because all of the major components of CCS – the capture, the transport, and the injection and storage – have been demonstrated and are currently in use at commercial scale. For example there are several industrial projects in the U.S. that are currently capturing the CO₂ for use in enhanced oil recovery (EOR) or other applications. There have been numerous smaller-scale projects that have demonstrated the technology, and there are several full-scale projects – both in the U.S. and internationally – that are under construction today. Thus, the EPA has determined that partial CCS is the Best System of Emission Reduction (BSER) for new coal-fired power plants.

Several important distinctions must be made when comparing this determination with other evaluations of the technology. For example, very often other evaluations of the state of the technology (i.e., whether it is "technically feasible" or "commercially viable") have been focused on implementation of full CCS (i.e., capturing 90+% of the CO₂). In the recently proposed performance standards for new fossil fuel-fired power plants, the EPA determined that "the cost of 'full capture' CCS without EOR is outside the range of costs that companies are considering for comparable generation and therefore should not be considered BSER for CO₂ emissions for coal-fired power plants." (79 FR 1430)

Some evaluations have focused on "widespread" implementation and some have focused on the technical and commercial feasibility of retrofit implementation (i.e., at existing units rather than at new units). The President's Interagency Task Force on Carbon Capture and Storage was charged with proposing a plan for widespread, cost-effective deployment of CCS by 2020. EPA's proposal for new power plants does not require, nor does it anticipate, the need for widespread implementation of CCS technology.

The Honorable John D. Dingell

1. During the Hearing, you indicated that you have reached out to stakeholders, including industry stakeholders, about components of greenhouse gas rules for new and existing power plants. Please submit for the record all of the actions you and your office have taken with regard to the development of these rules.

EPA has participated in more than 200 meetings with utility, labor and environmental groups on the components of greenhouse gas rules since August 2013. More meetings are scheduled for the future. Additionally, an EPA video webinar about the Climate Action Plan and CAA 111(d) has been viewed more than 3,800 times. Furthermore, more than 3,300 people attended and more than 1,600 people offered oral statements at the 11 public listening sessions EPA held around the country, and over 2,000 emails have been received at carbonpollutioninput@epa.gov.

Public hearings were held in the spring of 2012 on the proposed carbon pollution standards for new sources in Washington, D.C. and Chicago. More than 600 people attended these hearings, and more than 300 people provided oral testimony. In addition, more than 2.5 million public comments were received on the previous (April 2012) proposal, and the EPA considered the information contained in those comments in development of the recently proposed new source performance standards.

Attachment 2-Additional Questions for the Record

The Honorable ED Whitefield

1. On June 25, 2013, President Obama issued a Presidential Memorandum directing EPA to re-propose greenhouse gas standards for new power plants no later than September 20, 2013, and to issue a final rule "in a timely fashion" after considering public comments.

- a. What is EPA's current schedule for issuing a final rule?

The proposed Carbon Pollution Standard (CPS) was signed on September 20, 2013 and published on Wednesday, January 8, 2014 in the Federal Register. The deadline for public comment on this proposal has been extended from March 10 to May 9, 2014. The agency intends to finalize the CPS in a timely fashion, after consideration of public comments, consistent with statutory obligations.

2. The Presidential Memorandum referred to above also directed EPA to propose standards, regulations or guidelines, as appropriate, for modified, reconstructed and existing power plants by June 1, 2014 and finalize them by June 1, 2015.

- a. Is this EPA's current schedule for the issuance of standards, regulations or guidelines for modified, reconstructed and existing plants?

Yes, this is the schedule the agency is currently operating under and we do intend to meet both of these deadlines.

3. The Presidential Memorandum referred to above also directed that EPA include in its guidelines addressing existing power plants a requirement that States submit to EPA implementation plans no later than June 30, 2016.

- a. What does EPA expect the agency's timeline will be for reviewing implementation plans by state.

It would be a high priority for the agency, and we would work as expeditiously as possible consistent with requirements that review would require notice and comment rulemaking.

4. Under the language of section 111(d) of the Clean Air Act, EPA establishes a procedure under which States submit to the EPA Administrator a plan that contains "standards of performance" for existing stationary sources.

- a. Does EPA agree that it is the role of States, not EPA, to establish standards of performance for existing stationary sources under section 111(d)?

See answer to 4 b.

- b. Does EPA agree that States, not EPA, would have the primary role in setting any standards of performance for individual electric utility generating units under section 111(d)?

Section 111(d) provides that states' may establish standards of performance for existing sources of pollutants under certain circumstances and pursuant to a process created through an EPA rulemaking. If a state fails to provide a satisfactory performance standard and plan, the EPA may set performance standards and implement and enforce them in that state. EPA's proposed rule to establish the process for states to set such standards will include solicitation of public comment on the respective roles of the EPA and the states in establishing and implementing standards of performance. At the same time we anticipate proposing that requirements for state plans allow each state to establish programs appropriate to address its own sources and circumstances.

- c. Does EPA agree that any standards of performance established for existing electric generating units under section 111(d) should be achievable by individual existing electric utility generating units?

Under the statute, the term "standard of performance" means a "standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." EPA is exploring all options available for achieving cost effective standards of performance by analyzing, among other things, results from the extensive outreach to states, industry, and other stakeholders we conducted over the past several months.

5. You testified that for EPA's planned greenhouse gas regulations for existing power plants, "EPA will set the target, but then the states will have flexibility to meet that in whatever way makes sense to them. So it does not need to be a unit by unit regulation, or expectation."

- a. What do you mean when you refer to "the target" to be set by EPA? Please explain.

A target is a goal established by the emission guidelines. This goal can be expressed in several ways, such as a rate, mass or percentage reduction. States will be expected to meet the target using the programs performance standards or regulations that they designed to address the emission guidelines.

6. Prior to Administrator McCarthy's signing proposed greenhouse gas standards for new electric utility generating units on September 20, 2013, was EPA aware of the provisions of the Energy Policy Act codified at 42 U.S.C. 15962(i) that state: "No technology, or level of emission reduction solely by reason of the use of technology, or the achievement of the emission reduction, by 1 or more facilities receiving assistance under this Act, shall be considered to be...adequately demonstrated for purposes of (section 111 of the Clean Air Act)...?"

- a. Given the proposal makes specific reference to technologies receiving assistance under the Energy Policy Act of 2005, why were these provisions not specifically addressed in the proposal?

EPA does not believe that these provisions impact its determination. EPA based its determination on a number of projects and other information including projects that did not receive any assistance under the Energy Policy Act of 2005 (EPA05). EPA has issued a Notice of Data Availability (NODA) that notes the availability of a Technical Support Document (TSD), which we have attached, in the rulemaking docket that further details this position.

7. Prior to Administrator McCarthy's signing proposed green house gas standards for new electric utility generating units on September 20, 2013, was EPA aware of the provisions of the Energy Policy Act codified at 26 U.S.C. 48A(g) that state: "No use of technology(or level of emission reduction solely by reason of the use of the technology), and no achievement of any emission reduction by the demonstration of any technology or performance level, by or at one or more facilities with respect to which a credit is allowed under this section, shall be considered to indicate that the technology or performance level is adequately demonstrated for purposes of section iii of the Clean Air Act..."?

- a. Given the proposal makes specific reference to technologies receiving tax credits under the Energy Policy Act of 2005, why were these provisions not specifically addressed in the proposal?

We have attached a TSD which has also been placed in the docket to allow for public comment, which explains EPA's viewpoint on the interaction between EPA05 and the agency's proposed BSER determination. As the TSD explains, EPA believes that it may use information from the projects if it is used in conjunction with other evidence. As the TSD explains, its determination was in fact based on a larger set of evidence including a number of projects that have not received EPA05 funding.

8. To what extent was the U.S. Department of Justice consulted by EPA regarding the proposed standards of new power plants announced on Sept. 20, 2013?

The U.S. Department of Justice (DOJ) was part of the interagency review process, which was coordinated by the Office of Management and Budget (OMB). During the review, DOJ had

complete access to the proposal and all supporting documentation provided to the OMB as part of the interagency review process.

9. To what extent was the U. S. Department of Energy (DOE) consulted by EPA regarding the proposed standards for new power plants announced on Sept. 20, 2013?

The U.S. Department of Energy (DOE) was part of the interagency review process, which was coordinated by the Office of Management and Budget (OMB). As part of this review, DOE had complete access to the proposal and all supporting documentation provided to the OMB as part of the interagency review process.

In addition, DOE was consulted during the development of the Carbon Pollution Standard because the EPA relied on cost assessments conducted by the DOE for new fossil fuel-fired power plants utilizing carbon capture and storage systems.

a. In your response, please identify which DOE offices(s) and/or laboratories EPA consulted regarding the proposed rule.

The agency consulted with both DOE's Fossil Energy (FE) Headquarters Office and the National Engineering Technology Laboratory (NETL).

b. In your response, please identify when EPA consulted with these DOE offices and/or laboratories regarding the proposed rule.

The U.S. Department of Energy (DOE) was part of the interagency review process, which was coordinated by the Office of Management and Budget (OMB). As part of this review, DOE had complete access to the proposal and all supporting documentation provided to the OMB as part of the interagency review process.

In addition, DOE was consulted several times during the development of the Carbon Pollution Standard because the EPA relied on cost assessments conducted by the DOE for new fossil fuel-fired power plants utilizing carbon capture and storage systems.

10. Prior to Administrator McCarthy's signing proposed greenhouse gas standards for new electric utility generating units on September 20, 2013, did DOE officials or staff raise concerns regarding EPA's proposed requirement of carbon capture and storage (CCS) technologies for new coal-fired power plants?

a. Did DOE officials or staff raise concerns that CCS technologies for new coal-fired power plants are not adequately demonstrated?

The U.S. Department of Energy (DOE) was part of the interagency review process, which was coordinated by the Office of Management and Budget (OMB). The interagency review, which

included staff from DOE – commented on review drafts of the proposed rule, and all relevant topics were discussed. All comments were resolved prior to OMB clearance of the final document.

- b. Did DOE officials or Staff raise concerns that CCS technologies for new coal-fired power plants are not currently ready for widespread commercial deployment?

This proposed rule does not require widespread commercial deployment of CCS.

- c. Did DOE officials or Staff raise concerns that the costs of CCS technologies that would be needed for new coal-fired power plants to comply with the rule are prohibitively expensive?

DOE agreed that the cost estimates provided in NETL's 'Cost and Performance' reports are the best, most thorough and transparent information available. EPA consulted with DOE staff to ensure that the costs were appropriately characterized in the proposed rule.

- d. Did DOE officials or staff raise concerns about the commercial feasibility of the proposed standards for new coal-fired power plants?

All relevant topics were discussed as part of the interagency review, and all agency comments were resolved prior to clearance of the final document.

The Honorable Joe Barton

1. What is the average cost of construction and operation of a coal-fired power that would comply with current EPA regulation?

- a. What percentage of the total cost is directed toward emissions control?
b. What studies or analyses does EPA rely on for these estimates?

EPA is aware of some engineering studies that assess the current cost to construct and operate new coal-fired power plants. EPA relied on the NETL 'Cost and Performance' reports and believes that they are the best, most thorough and transparent studies available. However, those studies include the costs for equipment to control of criteria pollutants (i.e., SO₂, NO_x, and PM) and toxic air pollutants (mercury and other metals, toxic acidic gases, etc.) and do not break out costs with and without those controls. As noted below, EPA has broken out the costs for the controls needed to meet the proposed NSPS in the proposed rule.

2. What is the average cost of construction and operation of a coal-fired power plant would comply with the recently proposed carbon dioxide emissions standards (not factoring revenue from sale of CO₂)?

- a. What percentage of the total cost is directed toward emissions control?

- b. What percentage of the cost of emission control is directed toward injection and storage of CO₂?
- c. What studies or analyses does EPA rely on for these estimates?

As previously stated, EPA is aware of some engineering studies that assess the current cost to construct and operate new coal-fired power plants. EPA relied on the NETL 'Cost and Performance' reports and believes that they are the best, most thorough and transparent studies available. The EPA estimated the costs for a new supercritical pulverized coal (SCPC) boiler and a new integrated gasification combined cycle (IGCC) that would meet the proposed 1,100 lb CO₂/MWh performance by implementing partial CCS. Those costs are provided in Table 6 of the proposed rule (79 FR 1430).

- 3. What is the status of EPA's proposal to exclude geologically sequestered CO₂ from regulation under the Resource Conservation and Recovery Act's hazardous waste program?

- a. Given the great deal of legal and regulatory uncertainty surrounding geologic storage and liability protection, please describe how EPA accounted for these costs.

On January 3, 2014, EPA finalized a rule to exempt geologically sequestered CO₂ from regulation under the Resource Conservation and Recovery Act's hazardous waste program. Information on the final rule can be found at - <http://www.epa.gov/wastes/nonhaz/industrial/geo-sequester>

EPA prepared a revised analysis of the potential cost impacts associated with the final rule. This revised analysis is presented in the final rule as a support document entitled: *Assessment of the Potential Costs, Benefits, and Other Impacts — Hazardous Waste Management System: Conditional Exclusion for Carbon Dioxide (CO₂) Streams in Geologic Sequestration Activities: Final Rule (Assessment document)*.

In general, entities that may be directly affected by the final rule include CO₂ generators and sequestration facilities that have UIC Class VI wells. These entities are likely to experience net cost savings as a result of the rule. Entities transporting the CO₂ stream that would otherwise be hazardous under subtitle C of RCRA must continue to meet the baseline DOT requirements and are expected to experience no increased costs, or cost savings. Increased costs associated with the review of selected CO₂ exclusion certification statements are expected for EPA and state governments.